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COMMERCIAL FISHERIES REVIEW

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JOHN L. FARLEY, DIRECTOR

COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries
prepared in the BRANCH OF COMMERCIAL FISHERIES

A. W. Anderson, Editor

J. Pileggi, Associate Editor H. M. Bearse, Assistant Editor

Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C.

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CONTENTS

COVER: Depicts the third and last (king salmon) of three stamps issued this year to emphasize the importance of fish and wildlife conservation in America. This king salmon stamp, reproduced from a drawing by Bob Hines, artist of the U. S. Fish and Wildlife Service, was released at Seattle, Wash., on November 9, 1956. This marks the first time that United States stamps have been issued to call attention to the country's important fish and wildlife resources. (See pp. 32 & 33 of this issue.)

Page

Development of Markets for Underutilized Lake Erie Fish--Progress Report, by Ernie D. Premetz 1
Correlation of pH and Quality of Shucked Southern Oysters, by E. A. Gardner and B. M. Watts 8

Page

RESEARCH IN SERVICE LABORATORIES: 16
Cold Storage Life of Fresh-Water Fish--No. 3 (Lake Herring, Northern Pike, and Whitefish) ... 16
Cold-Storage Studies on Gulf of Mexico Yellowfin Tuna 18
Fungicidal Properties of Modified Unsaturated Fish Oils 19
North Atlantic Shrimp Keeping Quality in Cold Storage 20
Technical Note No. 34 - Growth Characteristics of the Pink Yeast That Causes Discoloration of Oysters 21
TRENDS AND DEVELOPMENTS: 24
California:
1956/57 Sardine Season off to a Good Start 24
Periodic Flights to Study Pelagic Fish Distribution (Airplane Spotting Flight 56-7) 24
Survey by N. B. Scofield to Assess Relative Abundance of Sardines (Cruise 56-S-4) 25
Yellowfin and Skipjack Tuna Tagged and Measured by Clipper Elsinore (Cruise 56-C-4) 26
Canned Fish Consumer Preference Study:
Tuna Most Popular Canned Fish 27
Canned Tuna Packed in Oil Preferred by Housewives 27
Canned Sardines Purchased Two or More Cans at a Time 28
Deveined Canned Shrimp Preferred by Consumers 29
Cans--Shipments for Fishery Products, January-July 1956 29
Customs Simplification Act of 1956 Analyzed 30
Federal Aid Funds Apportioned to States for Sport Fish and Wildlife Restoration Work 30

Page

TRENDS AND DEVELOPMENTS (Contd.):
Federal Purchases of Fishery Products:
Portions Included in Fresh or Frozen Fish Federal Specification 31
Fresh and Frozen Fishery Products Purchased by the Department of Defense, August 1956 32
Fish and Wildlife Motif on United States Postage Stamps 32
Fish and Wildlife Service:
Research Helps Bring Top-Quality Fish Closer to Consumer's Table 33
"Fish Parade" Promotion by Industry Backed by Interior Department 35
Florida:
Airboat Gill-Netting 36
Fur-Seal Skins 37
Great Lakes Fishery Investigations:
M/V Cisco Tries to Locate Summer Grounds of Walleye in Lake Huron (Cruise 5) 38
Lake Huron Investigations Continued by M/V Cisco (Cruise 6) 39
Market for Frozen Foods Increases 50 Percent in Year 40
North Atlantic Fisheries Exploration and Gear Research:
Deep-Water Trawling For Ocean Perch by M/V Delaware (Cruise 26) 40
North Atlantic Fisheries Investigations:
Two-Year-Olds Predominate in Red Hake Population (M/V T-79, Cruise 6) 41
Underwater Television Equipment Tested Under Tow by Vessel T-79 (Cruise 7 and 9) 42
North Atlantic Herring Research:
Herring Exploration Along Maine Coast and Bay of Fundy by M/V Metacomet (Cruise 6) 42

Contents Continued Page 137

COMMERCIAL FISHERIES REVIEW

November 1956 Washington 25, D.C. Vol.18, No.11

DEVELOPMENT OF MARKETS FOR UNDERUTILIZED LAKE ERIE FISH--PROGRESS REPORT

By Ernie D. Premetz*

BACKGROUND

An investigation of new markets for the underutilized fish populations of Lake Erie was undertaken August 1, 1955, by the Fish and Wildlife Service's Branch of Commercial Fisheries at the specific request of the Lake Erie Fish Management Committee. Funds for the project were provided by the Saltonstall-Kennedy Act of 1954. Headquarters for this study was established near Cleveland, Ohio. Lake Erie was chosen as the site of the pilot market development program in the Midwest because of the tremendous numbers of rough fish in this Lake, particularly in the Western basin. The Service's role has been largely that of endeavoring to develop and cement contacts between producing and buying groups.

Fig. 1 - Concentration of dead gizzard shad washed ashore at West Basin, Lake Erie.

POTENTIAL ROUGH FISH PRODUCTION

A preliminary survey of the Lake Erie area indicated that there are very large populations of rough fish that play only a secondary role in the commercial catch because of economic selectivity. These consist of gizzard shad (sawbellies), goldfish, sheepshead, carp, burbot, and white bass.

Knowledge of the potential availability of the various species of rough fish in Lake Erie is practically nil and it was difficult to determine the potential quantity that could be produced by Lake Erie fishermen. We have had to rely almost completely on the educated guesses of fishermen. Recently, the Ohio Commercial Fishermen's Association distributed questionnaries among its members asking that they indicate the quantity of each species of rough fish they felt they could produce incidental to their marketable fish during each month of the fishing season. Although all questionnaires have not as yet been returned and processed, a preliminary estimate of the potential rough fish production was obtained, using available figures (table 1). Since these are estimates from only part of the fishermen, they

* Fishery Marketing Specialist, Educational and Market Development Section, Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Sheffield Lake, Lorain, Ohio.

Note: Submitted to the Lake Erie Fish Management Committee, Buffalo, N. Y., June 6-7, 1956.

do not represent the true potential of rough fish from Lake Erie. This is particularly true for a species such as gizzard shad.

Table 1 - Potential Rough Fish Production by Members of the Ohio Commercial Fishermen's 1/ Association

Month	Sheepshead	Burbot	Carp	Gizzard Shad	Total
	(Thousands of Pounds)				
March	130.0	11.2	310.9	185.6	637.7
April	2,708.0	42.0	940.4	594.0	4,284.4
May	5,712.4	139.2	506.4	1,419.2	7,777.2
June	4,948.2	76.0	640.3	1,724.8	7,389.3
July	761.4	4.4	255.0	1,044.8	2,065.6
August	285.2	4.8	305.4	450.8	1,046.2
September	371.2	9.4	106.8	449.6	937.0
October	277.2	15.2	184.5	507.2	984.1
November	237.2	35.2	141.9	161.6	575.9
December	44.5	18.0	6.4	82.8	151.7
Total	15,475.3	355.4	3,398.0	6,620.4	25,849.1
Actual Landings, 1955	1,575.5	89.3	2,406.9	0	4,071.7

1/ These are estimates from only part of the fishermen. The actual potential is considerably greater.

PROBLEMS IN UTILIZING ROUGH FISH

Let us assume that the fishermen can produce about 25 million pounds of rough fish, as indicated. Even though we had a ready market for all of these fish, there would still be a number of problems to be overcome before we could utilize these fish. Chief among these is the lack of adequate freezer space in the Lake Erie area. Last fall, J. W. Slavin, Refrigeration Engineer, and David Miyauchi, Fishery Products Technologist, from the Service's Fishery Technological Section made a survey of cold storage and freezing facilities along Lake Erie from Cleveland to Toledo, Ohio. Their report pointed up the inadequacy of freezing and cold-storage facilities throughout this area.

Another problem is the high cost of trained labor in the Lake Erie area, which would make it uneconomical for most producers to handle quantities of rough fish that are normally expected to bring a low price. If, however, rough fish could be moved with a minimum of handling, most producers would be willing to handle these fish.

Still another problem, undoubtedly the most important to the fishermen, is the relatively low price paid for rough fish by processors of food for animals. Initially, most fishermen indicated they could catch no fish for less than five cents a pound. Most fishermen now feel they can catch for about two cents a pound, and some feel they can produce for even less. If the problems of refrigeration, handling, and transport can be solved, a price agreement between fisherman and buyer could be more readily attained.

Many possible markets for Lake Erie rough fish have been explored. Among these are: human food industry, fur farm industry, pet food industry, fish meal industry, and fish hatchery foods.

FOR HUMAN CONSUMPTION

Naturally, the first market to be considered for Lake Erie rough fish would be that of human food. At the present time, a limited market is available for carp, sheepshead, and burbot for human consumption. Our investigations show, however, that it is doubtful that any increase in this area can be expected. The human food market for rough species has declined in the past few years. This past year the

prices for rough species have been particularly low. Lake Erie fishermen are finding it uneconomical to transport species such as carp to Chicago to compete with the fish produced locally and more cheaply. Some rough fish are being sold live in Southern markets for stocking purposes, but it is doubtful that this business will grow sufficiently to be of any appreciable benefit to Lake Erie fishermen.

Gizzard shad, capable of production in tremendous quantities, have never been used as human food, and it is doubtful that they ever will be.

FOR ANIMAL FEEDING

One of the best potential markets for Lake Erie rough fish is the fur farm industry. There are some 5,000 mink ranches in the United States and the National Board of Fur Farm Organizations estimates that these ranchers can use some 250 million pounds of fish a year. Over two thirds of these fur farms are within easy reach of Lake Erie fishermen.

The fur farmers are interested in purchasing greater quantities of fish, since prices for horse meat, the hitherto standard protein ration, are constantly rising. About four years ago, the price of horse meat was about $7\frac{1}{2}$ cents a pound as compared to about 12 cents a pound today. On the Pacific Coast, many ranchers are feeding as high as 90 percent fish at the present time, with success. Many Midwestern ranchers feed as high as 50 percent fish and it is anticipated that they will soon be feeding as high as 65 percent fish. A few years ago it was a rarity to see more than 15- to 20-percent fish in mink diets in the Midwest.

The mink industry is a growing industry. Reportedly, some 70 percent of all furs used in the United States are mink. Pelt production has risen about 15 percent yearly for the past several years. The average pelt price has increased 10 to 20 percent in recent years.

Since the mink industry seemed the greatest potential market for rough fish, our initial market development activities have been directed, for the most part, to this market.

Fig. 2 - Removing and hauling away gizzard shad dead from natural causes at West Basin, Lake Erie. Gives some idea of the potential fishery for this species if some use was found for it.

FISH FOR PET FOOD PACKERS

Use of fish in the pet food industry has increased tremendously during the past decade. In 1947, this industry packed about 43.7 million pounds of fish-based pet foods, valued at almost $4 million to the packer. In 1955 the pack of fish-based pet food totaled 256 million pounds, valued at $27.5 million. Part of this increase has been due to an expansion of the pet food industry, whereas, part has been due to the shortage of horse meat, with fish now being used as an effective substitute, especially in food for cats. Indications are that this industry will continue to expand during the next decade. Several pet food manufacturers have already started on long-range expansion of plant facilities in fish-producing centers.

Shortage of products normally used in processed dog food, such as horse meat, is forcing these canners to look for a substitute. Fish may well be the logical re-

placement. The Department of Agriculture reports that about 50 percent of all processed dog foods are certified, which requires that the products be fit for human consumption, be nutritious, and contain no inedible materials. Recent conferences between the Departments of Agriculture and Interior and pet food manufacturers have encouraged a compromise and clarification in the interpretation of present dog food ingredients. If this compromise can be reached, the dog food industry could within the existing inspection service use considerably more fish in the future, thus creating an additional market for rough species.

FOR FISH MEAL

The fish meal industry was initially considered another excellent market for rough fish. Investigation showed, however, that a fish meal and oil operation was not economical in the Great Lakes area at the present time due to seasonal factors and the fact that production is dispersed over a wide area. The present price paid for this type of fish meal (about $140 a ton) precludes payment of more than about one cent a pound for the raw fish. Lake fish are low in oil content, and an operation in this area would be strictly for fish meal.

Plans and specifications for a fish reduction plant, mounted on a trailer bed and capable of being moved from place to place, have been designed for the Service by Renneberg and Sons, of Baltimore, Md. Although this unit was limited as to hourly capacity for a large-scale commercial operation, it was anticipated that it would serve some use in connection with state rough fish removal programs. Many states now find it necessary to pay considerable money to catch these fish and to haul them away for disposal. Possibly the fish could be made into fish meal and the money derived from its sale would defray removal costs. Several Midwestern States have developed their own rough fish marketing programs, and most of the rough fish is being either sold for human or animal food uses. A good example is that of the State of Wisconsin. Commercial fishing took about 3.6 million pounds of rough fish (sheepshead) out of Lake Winnebago last year. All of it found a ready market, primarily as mink feed. Wisconsin Conservation officials hope to more than double the take from Winnebago in 1956.

Other states are not so readily finding such markets and may well investigate the application of the portable reduction plant to their programs.

OTHER USES

Other possible markets for rough fish are Federal and state fish hatcheries and rearing stations, and the many trout and pondfish dealers throughout the United States. Although these outlets represent a potential market for millions of pounds of fish annually, many problems still require solutions before any substantial program can be assured. Further investigation of this market will be deferred until a later date.

WORK ON SUITABILITY OF ROUGH FISH FOR ANIMAL FOOD

Considerable work has already been done by the Fish and Wildlife Service's Technological Section, the University of Wisconsin, individual mink ranchers, and pet food manufacturers on the suitability of Lake Erie rough fish as animal food.

The Service has been working on the proximate composition of sheepshead from Lake Erie as early as 1951. Since that time a regular sampling of the principal species has been made to determine if seasonal and area differences occur in the principal constituents. Analyses were made of the edible portion and the trimmings. More recently, whole raw rough fish from Lake Erie were analyzed to determine the proximate composition and the thiaminase content (table 2).

Lake Erie rough fish run considerably higher in fat content than the marine fish, which many mink ranchers consider an asset. Thiaminase, an enzyme capable of thiamine destruction, is an important consideration particularly in fish to be used for feeding mink. If a small proportion of fish containing an appreciable amount of this enzyme is mixed with another lot of fish not containing the enzyme, the vitamin thiamine present in the mixed lot may be destroyed. Thiamine in the

Table 2 - Proximate Composition and Thiaminase Assay of Fresh-Water Rough Fish From Lake Erie

Species	Date Caught	Dry Matter	Protein	Fat	Ash	Thiaminase
Sheepshead 1/	Oct. 1951	24.2	18.4	6.0	1.1	4/
2/	June 1952	24.6	17.2	6.9	1.1	4/
1/	Aug. 1954	24.5	17.5	6.0	1.0	4/
3/	Sept. 1955	28.3	16.3	8.0	4.2	4/
3/	Nov. 1955	28.3	16.3	8.0	4.2	None
Gizzard Shad 3/	Nov. 1955	37.0	16.2	17.6	3.0	Present
Burbot 3/	Nov. 1955	22.8	13.9	5.2	2.4	Present
Carp 3/	Nov. 1955	32.7	16.5	10.6	5.0	Present
Goldfish 3/	Sept. 1955	32.7	16.5	10.6	5.0	4/
3/	Nov. 1955	32.7	16.5	10.6	5.0	Present

1/ Edible portion and trimmings. 3/ Whole raw fish.
2/ Edible portion only. 4/ Not analyzed for thiaminase.
Note: Analyses made by Service Technological Laboratory, College Park, Md.

diet is necessary to the proper growth and development of mink. Lack of thiamine causes chastic paralysis in mink. Thiaminase may also destroy the thiamine in other constituents in the diet. Cooking the fish prior to feeding the animals will destroy this enzyme. Raw fish containing thiaminase may be fed to mink if special precautions are taken to feed the raw fish apart from the other diet ingredients. Some mink ranchers feed raw fish known to have a high thiaminase content, such as carp, on alternate days, with no detrimental effect.

The Service plans considerable work on fresh-water fishes this year. Samples of rough fish will be collected throughout the year to ascertain seasonal and area variation in the proximate composition of these fish. The results are being made available to the animal food industries and fur farmers to facilitate the development of a properly balanced nutritive diet.

Fur animal nutritional research has been conducted by Dr. Leoschke of the University of Wisconsin. Experiments recently completed showed that sheepshead was an excellent feed for mink. It was thiaminase-free and could be fed in either the raw or cooked state. Dr. Leoschke is at present interested in doing similar nutritional research, using gizzard shad. He believes this species shows a great deal of promise as mink feed.

Individual mink ranchers also have conducted fish-feeding experiments. Most of this work is being done by the larger mink ranchers. Many lake species have been tried. Extensive use of sheepshead on mink ranches in the Midwest resulted from just such experiments. Last year some of the mink ranchers fed sheepshead, exclusively, with promising results. Some ranchers are now planning to try burbot and gizzard shad along with cooked smelt and carp. Some ranchers have suffered losses because of lack of good basic information on various species of fish. Most favor nutritional research by some central agency where controlled experiments can demonstrate that most suitable application of fish to mink diets.

Pet food concerns have tested practically every species of "trash" fish on both coasts and in the Gulf area and are now testing fresh-water rough fish. Some of

the larger concerns have this analytical work done by their own staffs, while other have commercial testing laboratories run the tests for them. Smelt is already being used by some of the cat food canners in the Midwest. Other species, such as carp, burbot, and gizzard shad will be tested in the near future.

PROBLEMS IN DEVELOPING ROUGH FISH MARKETS

Initial progress in developing markets for Lake Erie rough fish has been extremely encouraging. Emphasis has been primarily on markets in the fur farm and pet food industries as outlets for Lake Erie rough fish.

Many mink ranchers have not resorted to Lake Erie as a source of supply because of lack of information as to the potential of this lake and the limited availability of facilities, such as freezers, in the area. After some initial survey work, it is evident that tremendous supplies of rough fish are available in Lake Erie, particularly in the Sandusky Bay area where haul-seine catches average 75 percent rough fish and, at certain times of the year, go as high as 90 percent.

One of the leading mink ranchers in the world became interested in fish from the Lake Erie area shortly after the Service program was initiated. This rancher surveyed the area completely in cooperation with the Service's market development staff, the Ohio Division of Wildlife, and commercial fishermen. Supply proved no problem, but it was obvious that rough fish removal would be drastically limited by lack of adequate freezing and cold-storage space in the area. Unless some on-the-spot facilities were available, trucking costs to distant freezers would make an operation in this area economically difficult. The groups explored the possibility of establishing large freezers at Sandusky, in the heart of the rough fish area. This seemed promising but costly. Through affiliates on the Pacific Coast, the groups learned of a brine-tank holding method which had proved successful in holding fish in the chilled state for more than a month. A 10,000-pound-capacity tank was assembled on a mink ranch and experiments conducted. The tanks are lined with refrigeration coils which are designed to drop the temperature of the brine solution (3 parts/million) to 28° F. One of the recently-developed antibiotic type products was added to the chilled brine solution to determine the suitability of this procedure for the preservation of fish as a source of mink food. If the tests prove entirely satisfactory, it is anticipated that the company involved will apply this technique on a larger scale in Lake Erie to insure continuing sources of a fish food product.

Others have looked into the problem of lack of freezer space. A Chicago concern, long active in the vitamin field, recently developed a process which is similar to the meat drum-pack process. In it the rough fish are ground and cooked in vats. After thorough cooking, and the inclusion of a special preservative, it is packed in metal containers with a capacity of 100 pounds each. This product will keep for extended periods in nonrefrigerated storage without spoilage. The cans may be opened and closed repeatedly without any effect on the product. A cannery in the Sandusky area has been found satisfactory for the operation, and a test run using carp has already been conducted successfully. It was anticipated that this plant would be in operation this year, probably during the heavy rough fish production in May and June.

A number of mink feed brokers also plan to truck sheepshead to freezers in Midwestern States. These concerns have already made contacts with Ohio fish producers, and some contracts have been signed for substantial quantities of this year's rough fish production. However, lack of adequate freezer space on Ohio mink ranches precluded extensive storage of Lake Erie fish during the periods when these fish are most plentiful. If adequate holding facilities, such as brine tanks, are made available in the Sandusky area, use of lake fish by Ohio ranchers is expected to increase tremendously.

Considerable effort by the Service's market development staff also was directed to the pet food industry. Although some of the small cat food canneries do use quantities of lake fish, primarily smelt, in their operations, larger concerns are using practically no fresh-water fish in their product. A number of the large pet food concerns have been contacted. Most expressed interest in Lake Erie rough fish and indicated they would investigate the feasibility of using these fish in their operations. One of the leading pet food concerns in the country has for some time planned expansion of its pet food operations. Although it can expand somewhat in its present areas of operation, it would prefer to set up cannery operations in the Midwest. This concern has requested our cooperation in obtaining monthly samples of each of the Lake Erie rough species throughout this coming fishing season. These fish will be thoroughly tested by its research staff, test packs will be made, and feeding trials held. An initial shipment of sheepshead, gizzard shad, burbot, carp, and goldfish has already been sent to this concern for testing. If Lake Erie rough fish can be used, this segment of the industry plans expansion of plant facilities in the Midwest and will use a great deal of rough fish.

Indications are that almost all sheepshead produced in the Lake Erie area will find ready markets in the fur farm industry, once adequate handling facilities are established along Lake Erie's shore. In addition, markets for other species of rough fish, such as carp, goldfish, burbot, and gizzard shad should be forthcoming. Fuller utilization will undoubtedly result if present tests being conducted by pet food canners indicate that Lake Erie rough fish can be used as cat and dog food.

RECOMMENDATIONS FOR DEVELOPING ROUGH FISH MARKETS

We should look at 1956 as a year of experimentation. We hope to see 1957 as a year of utilization. We can look on Lake Erie as the proving grounds for future market development work in the Midwest.

To further facilitate the development of markets for Lake Erie fish, the following program of research is recommended:

1. A thorough study of availability of each species of rough fish by area throughout the fishing season. Concise estimates of potential should be obtained from fishermen and by direct observation.

2. Species composition of rough fish catches by area throughout the fishing season should be obtained through interviews with fishermen and direct observations and sampling.

3. Proximate composition and thiaminase assays of all rough fish species should be determined, by area, at prescribed intervals throughout the fishing season.

4. Fur animal nutritional studies, using lake species, should be conducted, if possible. These would have to extend through several generations to be effective.

5. Statistical information should be collected which would indicate the amount of rough fish marketed, and its value.

6. Establishment of a sound biological program to measure the effect of rough fish removal on other species.

7. And last, but not least, a continuing survey of all potential markets for rough fish.

It is readily obvious that the success of any market development program in the Lake Erie area requires the cooperation of market development people, technologists, biologists, and fishermen.

CORRELATION OF pH AND QUALITY OF SHUCKED SOUTHERN OYSTERS[1/]

E. A. Gardner* and B. M. Watts*

ABSTRACT

From the experiments the spoilage pattern of refrigerated Southern oyster meats was found to be similar, in general, to that reported in other locations. This spoilage is fermentative in nature, characterized by a gradual and continuous decrease in pH and the development of a sour odor. The drop in pH is not necessarily correlated with the sour odor. A seasonal variation in pH, initially and at intervals during subsequent storage at 41° F. (5° C.), has been observed, with the values being lowest during the summer and highest during the winter.

Spoilage patterns and pH changes have been followed also in oyster liquor held under various conditions as compared to oyster meats, in the adductor muscles as compared to the soft tissues, in washed and unwashed oysters, and in homogenized oysters.

INTRODUCTION

The possible usefulness of pH measurements as a reliable objective means of judging freshness in shucked oysters has been suggested in several previous studies. Hunter and Linden (1923) found a relationship between the odor and appearance of Atlantic coast oysters (Crassostrea virginica) and the pH of their liquor. They concluded that oysters passed from good to stale in a zone represented by pH values of about 6.1 to 5.6. From a pH of 5.3 to 4.9 they passed from stale to sour or putrid, and below 5.0 the oysters were described as being in an advanced stage of putrefaction.

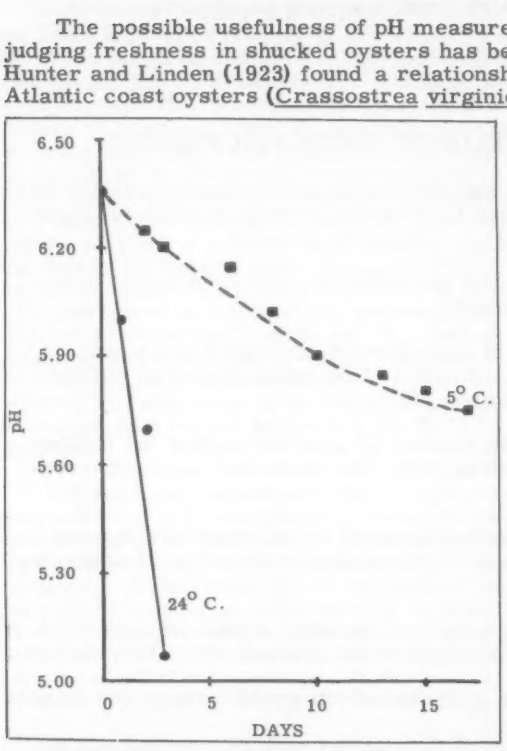


Fig. 1 - pH of shucked oysters held at 41° F. (5° C.) and 75° F. (24° C.) for 15 days.

In addition to pH values obtained with ground oyster meats as well as oyster liquor, Baldwin, Puncochar, and Pottinger (1941) measured changes in water-soluble nitrogen, alcohol-soluble nitrogen, and total titratable acids during storage of Eastern oysters. From the standpoint of ease, rapidity, and reliability of results, pH values seemed to them to be the most promising of these measurements as an indicator of oyster freshness. They found that the pH of the liquor was initially higher than that of the oyster meats, but both values tended to be equal near the end of a storage period of about a week or ten days. According to their results, they described oysters at a pH of 6.2 to 5.9 as being in a good condition, at pH 5.8 in an "off" condition, at pH 5.7 to 5.5 in musty condition, and at 5.2 and below as sour or putrid.

1/ This research was conducted by Florida State University under a contract with the U. S. Fish and Wildlife Service. It was financed with funds provided by Public Law 466, 83rd Congress, approved July 1, 1954 (the Saltonstall-Kennedy Act). The study was made possible through the cooperation of the Oceanographic Institute, Florida State University.

*Department of Food and Nutrition, Florida State University, Tallahassee, Fla.

Piskur (1947) concluded that pH measurements may possibly serve as an objective index of the quality of commercially-shucked Pacific oysters (Ostrea gigas). In more recent work, Pottinger (1948, 1951), using Eastern oysters, found that the pH continued to decrease during storage in crushed ice, with the oysters becoming progressively more sour and changing markedly in appearance. The time required for an off-odor to develop after the liquor reached a pH of 6.0 or 5.9 varied between three and six days.

In none of the aforementioned studies was any mention made of the mechanisms which might be responsible for the souring, nor were the products which were formed identified. Presumably, acids are formed from the breakdown of glycogen known to be distributed throughout the oyster. It is not known whether this breakdown is due to bacterial action or to glycolytic enzymes within the oyster tissue.

Humphry (1944, 1950), in a basic study of glycolysis in the oyster adductor muscle, demonstrated a relatively slow production of lactic and pyruvic acids in tissue homogenates. He concluded that glycolytic activity in the oyster muscle proceeds at a much slower rate than in mammalian muscle, where all available glycogen is converted into lactic acid within a few hours under anaerobic conditions which develop within the tissue following slaughter. Apparently, no work is available on glycolytic systems in other oyster tissues, although Hatanaka (1941) found that most of the glycogen is in the soft tissues. Bargeton (1941) reported that connective tissue was richest in glycogen.

The present study, conducted from February 1, 1955, to February 1, 1956, was directed toward the correlation of pH and organoleptic changes in the Southern oyster (Crassostrea virginica) under various storage conditions and investigation of the mechanism involved in souring as a basis for appropriate control measures.

EXPERIMENTAL

MATERIAL AND METHODS: All oysters used in this study were of the species Crassostrea virginica, tonged from Cat Point Reef near Apalachicola, Fla. Some were tonged directly and others were purchased either in the shell or freshly-shucked from a commercial packing house in Apalachicola, Fla. The pH of all oysters was measured initially in from 1 to 4 hours after shucking and washing.

All pH measurements were made with a Beckman model H^2 pH meter using the slurries of 35- to 50-gram (3-4 oysters) random samples of oysters which were blended in a Waring blendor for about two minutes. The odor and appearance of the oysters and liquor were noted at the time pH values were determined. Odor was rated organoleptically by the authors.

RESULTS: Oysters Held at Refrigerator and Room Temperature: Shucked oysters were stored in pint metal friction-top cans at 41° F. (5° C.). To determine the rate at which spoilage would occur in unrefrigerated oysters, some were held at room temperature, 75° F. (24° C.). The pH, odor, and appearance were determined at intervals.

During refrigerator storage, the pH decreased gradually and continuously as the oysters and surrounding free liquor became less fresh in odor and appearance. Odor was noted to pass from fresh to stale, then musty. As the pH decreased, the off-odor became progressively more sour and finally became very sharply sour. At this time the oysters were less firm and were slightly darker and muddy in color. The surrounding free liquor was turbid with many gas bubbles rising to the surface.

When oysters were held at room temperature, the drop in pH was greatly accelerated and accompanied by equally rapid development of sour odor, flabbiness, and gas formation. Spoilage was qualitatively similar to that of refrigerated sam-

ples, but the rate was much more rapid. Figure 1 illustrates the difference in the rate of souring between refrigerated and unrefrigerated samples from one lot of oysters tested during the month of February.

An interesting observation was that shucked oysters stored at 41° F. (5° C.) in glass beakers or in metal cans with loose-fitting aluminum foil covers developed very little or no sour odor, although the pH decreased at the same rate as that of oysters from the same lots in containers with tight-fitting covers.

Seasonal Variations: During the period from February through June it was noted that the mean initial pH for oysters from the monthly sampling decreased slightly during each succeeding month. The range of this decrease was from 6.38 in February to 6.02 in June. This difference represents a real seasonal variation in pH of the oysters. It could not be attributed to increased ambient temperatures during holding and shucking periods, since the low initial pH in June was obtained on oysters that our laboratory workers tonged, placed immediately in iced containers, then shucked and analyzed the same day.

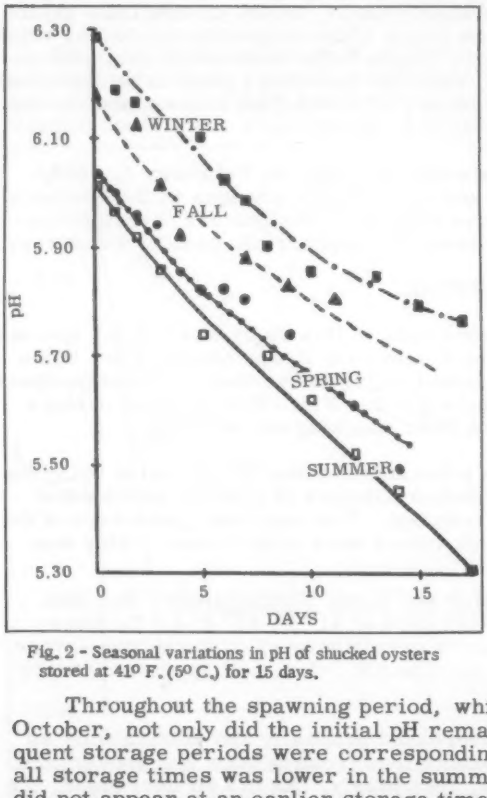


Fig. 2 - Seasonal variations in pH of shucked oysters stored at 41° F. (5° C.) for 15 days.

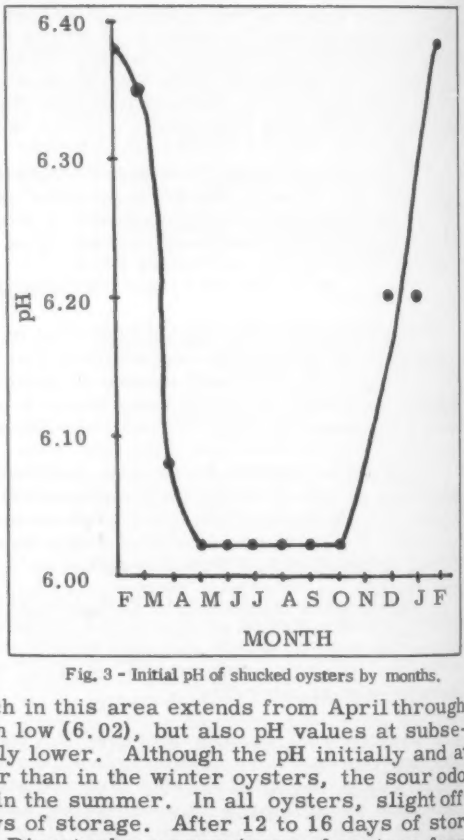


Fig. 3 - Initial pH of shucked oysters by months.

Throughout the spawning period, which in this area extends from April through October, not only did the initial pH remain low (6.02), but also pH values at subsequent storage periods were correspondingly lower. Although the pH initially and at all storage times was lower in the summer than in the winter oysters, the sour odor did not appear at an earlier storage time in the summer. In all oysters, slight off-odors began to be detected after 6 to 9 days of storage. After 12 to 16 days of storage they were generally designated sour. Direct odor comparisons of oysters from different seasons could not, of course, be made, but it was the authors' impression that sour odor showed up slightly earlier and became more intense in winter than in summer oysters, although the pH of the winter oysters was higher at all times. Changes in pH are shown in figures 2 and 3.

Oyster Liquor: If the drop in pH of oysters during refrigerated storage is caused by the action of glycolytic enzyme systems within the oyster tissue rather than by bacterial action, it might be expected that liquor, removed from all contact with the oyster meats immediately after shucking, might show little or no drop in pH on subsequent storage. On the other hand, a drop in pH of oyster liquor which remains in contact with the oyster meats might be expected since acids formed by glycolysis in the oysters could pass out into the liquor. Accordingly, pH changes were followed in (1) the shucking liquor stored separately from the oyster meats, (2) in the "contact" liquor (exuded by the oysters after washing and allowed to remain in contact with the oysters), and (3) in the oyster meats. The shucking liquor was drained from laboratory-shucked oysters, allowed to settle for 5 to 10 minutes to eliminate particles of shell and grit, then decanted and stored at 41° F. (5° C.) in glass beakers covered with aluminum foil. The washed oysters were also stored in glass beakers at the same temperature, and the liquor which was exuded was allowed to remain in contact with the oysters until time for pH determinations.

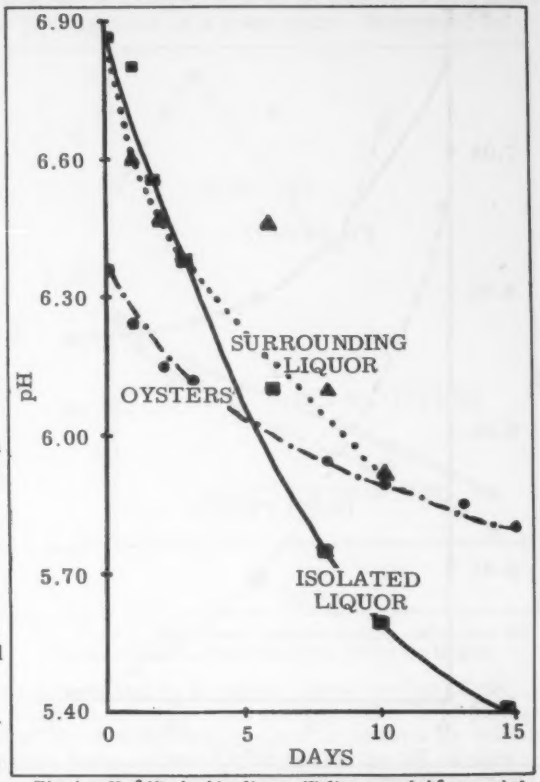


Fig. 4 - pH of (1) shucking liquor, (2) liquor exuded from and allowed to remain in contact with washed oysters, and (3) oyster meats stored at 41° F. (5° C.) for 15 days.

The initial pH values of both the shucking liquor and the liquor exuded after washing were higher than the initial pH of the oyster meats. The data are plotted in figure 4. In agreement with previous findings by Pottinger (1948, 1951), the pH values of the oyster meats and contact liquor were about equal after 11 days of refrigerator storage. Contrary to expectations, the pH of the shucking liquor decreased at a much more rapid rate than that of the oyster meats or of the contact liquor. However, while the odor of the oysters and contact liquor was the typical sour one, that which developed in the shucking liquor was predominantly "fishy," resembling that which develops in heat-treated oysters in which no drop in pH takes place. Both the shucking liquor and the contact liquor became very turbid.

Since the shucking liquor was not filtered, it probably contained suspended finely-divided particles of oyster tissue which may have supplied both substrate and enzyme systems. Furthermore, Yonge (1926, 1927, 1928) found that the digestive process in the oyster is not confined to the digestive glands, but may be carried out by freely moving phagocytes which may appear in the liquor. The greater drop in pH of liquor as compared to oysters can probably be attributed to its lower buffering capacity. Further study of shucking liquor was made in which some of the liquor was filtered through S&S black ribbon paper. Filtering immediately increased the initial pH of the liquor from 6.90 to 7.30, and as may be seen in figure 5, the pH of the filtered liquor decreased at a slower rate than than that of the unfiltered liquor.

Adductor Muscle and Soft Tissues: To determine the part played by glycolysis in the adductor muscle on the rate and amount of souring in the shucked oyster, the adductor muscle was dissected from some of the oysters and the pH values followed and compared for the whole oysters, adductor muscles, and oysters with muscles removed, all of which were stored at 41° F. (5° C.) for 15 days.

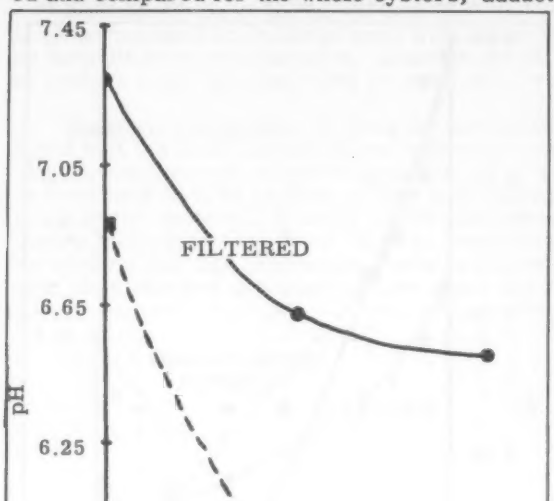


Fig. 5 - pH of filtered and unfiltered shucking liquor stored at 41° F. (5° C.) for 15 days.

The results of this study are presented in figure 6. Removing the muscles did not affect the initial pH of the remainder of the oyster meats, nor did it seem to have any effect on the rate of pH drop during storage for the 15-day period. The pH value of the muscles was initially higher than that of the whole oysters and oysters with muscles removed, and it remained high throughout the study. While the typical sour odor developed in the soft tissues, a "rancid fish" odor was detected in the muscles before eventual putrefaction.

Unwashed Oysters Stored in Own Shell Liquor: Observations were made on two lots of shucked oysters stored unwashed in their own shucking liquor in closed metal friction-top cans at 41° F. (5° C.). The pH decreased in these just as it did in drained washed oysters from the same lots, and the typical sour odor developed in each. This is contrary to the findings of King and his associates (1945) who reported putrefaction rather than souring in oysters stored in their own shucking liquor without washing. It is interesting also to note that while this liquor developed a "rancid fish" odor when it was stored separately from the oysters in glass beakers with aluminum foil covers, it developed a sour odor when allowed to remain in contact with the oysters. In both cases there was an eventual decrease in pH.

Homogenate of Whole Oysters: Changes of pH in homogenates of oysters were also followed with the objective of evaluating the possibility of using homogenized samples for certain other phases of experimentation with oysters in this laboratory. The shucked oysters were homogenized in a Waring blendor and the homogenate then stored in closed metal friction-top cans at 41° F. (5° C.). However, it was found that these blended samples did not follow the spoilage pattern of oysters which were stored unhomogenized. Instead of the usual drop, the pH increased from 6.02 to 6.20 by the eleventh day of storage, at which time there was an extreme ""rancid fish" odor. It was assumed that spoilage predominating in the homogenized oysters was oxidative, involving unsaturated fats which were exposed by blending, since high pH values and a fishy odor are characteristic of oxidative spoilage which has been found by Gardner and Watts (1956) to occur in cooked oysters.

DISCUSSION

The foregoing observations indicate that the spoilage pattern of whole refrigerated Southern oysters is similar, in general, to that reported for oysters in other locations. This spoilage is fermentative in nature, characterized by a gradual and continuous decrease in pH and the development of a sour odor. However, in the Southern oysters a seasonal variation has been found in initial pH and in pH values at intervals during storage. No particular odor or quality rating of Southern oysters can be correlated with a given pH value during all seasons of the year.

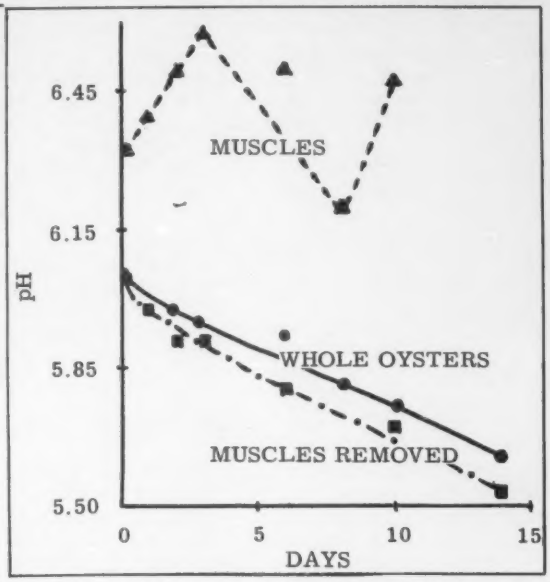


Fig. 6 - pH of whole oysters, adductor muscles, and oysters with muscles removed and stored at 41° F. (5° C.) for 15 days.

It is interesting to note that the pH, measured initially and at intervals during subsequent storage, is much lower during the summer months when the glycogen content of the oysters is at a minimum. Kokubo (1929) observed that the pH of the blood and pericardial fluid of the oyster (Ostrea gigas) decreased in early summer and increased in winter. He reported that the pH of these body fluids rapidly decreased when the oyster was subjected to respiration in water of high acidity, the lower limit in vivo being pH 5.40. Under these conditions the CO_2 content of these body fluids was increased. When oysters were subjected to respiration in water of high alkalinity, the pH of blood and pericardial fluid of the oysters rapidly increased to an upper limit in vivo of pH 8.45, and the CO_2 content remained unaffected by the increase in pH. It is possible that the seasonal variation in initial pH of Southern oysters is caused by seasonal change in pH of the water of the oyster beds. These changes in the pH of this water should be followed in any future work to shed further light on the value that can be assigned to pH as a test for quality of oysters.

Another possibility is that the composition of the oyster during the summer months, or spawning period, is such that the more acid parts of the organism contribute more to the pH of the whole oyster than they do during the winter months. For example, the style and the stomach were found by Yonge (1926-1927) to be the most acid parts of the oyster, with a pH of 5.2 and 5.5, respectively. It would be interesting to follow the seasonal pH of the various tissues and to compare these values with the pH of the whole oyster.

The initial pH of the adductor muscle, although higher than that of the soft tissues, apparently has no effect on the initial pH of the whole oyster, since the initial pH values of whole oysters and of oysters with muscles removed were identical. Furthermore, glycolysis in the adductor muscle appears to have no effect on the rate of souring in the whole oyster. This stands to reason, since the percentage of glycogen in the adductor muscle has been found by Hatanaka (1941) to be small as compared to that in the soft tissues. Ashikaga (1949) reported that glycogen in the whole oyster decreased to only 3 percent of the original after five days and was lost entirely after ten days when oysters were held at 37° F. (2.8° C.). After 5 and 25 days at 2°-4° F. (-17° to -15° C.), the percentages of glycogen remaining

were 83 percent and 63 percent, respectively. However, when fresh adductor muscles were stored at 6-9° F. (-14.5° to -12.8° C.), they contained about 71 percent of the original glycogen after three days. When the muscles were dried and preserved, the loss of glycogen was only 8.25 percent even after two years.

Considerable evidence has been accumulated to indicate that acid production resulting in the drop in pH is not necessarily related to the development of the sharp sour odor. While oysters stored in containers with tight-fitting covers decreased in pH and developed a sharp sour odor, it was observed that oysters from the same lot stored at the same temperature in containers with loose-fitting covers also decreased in the pH at the same rate, but developed little or no sour odor before ultimate putrefaction. Shucking liquor, stored separately from oyster meats, also decreased in pH, but developed a "rancid fish" odor rather than a sour odor. Oysters tonged during the summer months dropped to a very low pH (5.52-5.69) before a sour odor became evident. Conversely, Gardner and Watts (1956) have found it possible to produce the sour odor with very little or no drop in pH by heating the oysters just enough to partially inactivate the enzyme catalase. Explanations of these observations cannot be made until the mechanisms involved in spoilage are elucidated. By subjecting the oysters to sterilizing doses of radiation it may be possible to eliminate bacteria with only minor alteration of the enzyme systems within the oysters, and thus the role in oyster spoilage played by these two mechanisms may be revealed. Such work is in progress in this laboratory and will be reported on a later date.

SUMMARY AND CONCLUSIONS

The spoilage pattern of refrigerated Southern oyster meats was found to be similar, in general, to that reported in other locations. This spoilage is fermentative in nature, characterized by a gradual and continuous decrease in pH and the development of a sour odor. The drop in pH is not necessarily correlated with the sour odor. A seasonal variation in pH, initially and at intervals during subsequent storage at 41° F. (5° C.), has been observed, with the values being lowest during the summer and highest during the winter.

Spoilage patterns and pH changes have been followed also in oyster liquor held under various conditions as compared to oyster meats, in the adductor muscles as compared to the soft tissues, in washed and unwashed oysters, and in homogenized oysters.

LITERATURE CITED

Ashikaga, C.
1949. Biochemical Studies on the Pearl Oyster, Pinctada martensi. II. Changes of Glycogen Content During the Process of Preservation. Journal of the Agricultural Chemical Society of Japan, vol 23, pp. 63-65. (Chemical Abstracts 1950.)

Baldwin, W. H.; Puncochar, J. F.; and Pottinger, S. R.
1941. Some Preliminary Studies on the Relative Value of Methods for Indicating the Quality of Shucked (Eastern) Oysters. U. S. Fish and Wildlife Service, Bulletin F. I. 2469-K.

Bargeton, M.
1941. Vesicular Cells Containing Glycogen. The Distribution of Glycogen in Earthworms and Oysters. Museum of National Histoire Naturelle, Bulletin 13.

Gardner, E. A.; and Watts, B. M.
1956. Investigations of Deterioration of Cooked Oysters. Unpublished.

Hatanaka, M.
1941. Chemical Composition of the Oyster, Ostrea gigas Thunberg. Zeitschrift fur Untersuchung von Lebensmittel, vol. 81, p. 72. (Chemical Abstracts 1942.)

Humphry, G. F.
1944. Glycolysis in Extracts of Oyster Muscle. Australian Journal of Experimental Biology and Medical Science, vol. 22, pp. 135-138.

1950. Glycolysis in Oyster Muscle. Australian Journal of Experimental Biology and Medical Science, vol. 28, pp. 151-160.

Hunter, A. C. ; and Linden, B. A.
1923. An Investigation of Oyster Spoilage. American Food Journal, vol. 18, no. 11 (November), pp. 538-540.

King, W. H. ; Flynn, F. F.; and Gowanloch, J. W.
1945. Experimental Studies on Decomposition of Oysters Used for Canning. Journal of the Association of Official Agricultural Chemists, vol. 28, pp. 385-398.

Kokubo, S.
1929. The pH and Carbon Dioxide Content of the Blood, Pericardial Fluid, and the Body Fluid of the Oyster with Special Reference to Their Response to the Altered Condition of Sea Water. Science Reports of the Tohoku Imperial University, 4th series, vol. 4, pp. 207-257. (Chemical Abstracts.)

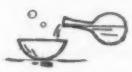
Piskur, F. T.
1947. Preliminary Study of Correlation of pH and Quality of Shucked Pacific Oysters. Commercial Fisheries Review, vol. 9, no. 6 (June), pp. 22-24.

Pottinger, S. R.
1951. A Study of pH of Strictly Fresh Commercially Shucked Eastern Oysters. Commercial Fisheries Review, vol. 13, no. 11a (November), pp. 8-10.

1948. Some Data on pH and Freshness of Eastern Oysters. Commercial Fisheries Review vol. 10, no. 9 (September), pp. 1-3.

Yonge, C. M.
1926-1927. Structure and Physiology of the Organs of Feeding and Digestion in Ostrea edulis. Journal of the Marine Biological Association of the United Kingdom, vol. 14, pp. 295-386.

1928. The Absorption of Glucose by Ostrea edulis. Journal of the Marine Biological Association of the United Kingdom, vol. 15, pp. 643-653.



OYSTER DRILL--THE OYSTER'S ENEMY

The oyster drill is one of the most serious problems facing the oyster industry, and effective control methods would be a tremendous boon to growers and harvesters of this shellfish.

The oyster drill, Urosalpinx cinerea, may add variety to its oyster menu in the form of mussels and barnacles. There is also evidence that cannibalism occurs among adult drills, and a variety of other mollusks, such as soft and hard clams, and scallops may also fall before this voracious predator. At times even small crabs, the carrion of fish or such lower invertebrates as encrusting bryozoans are devoured.

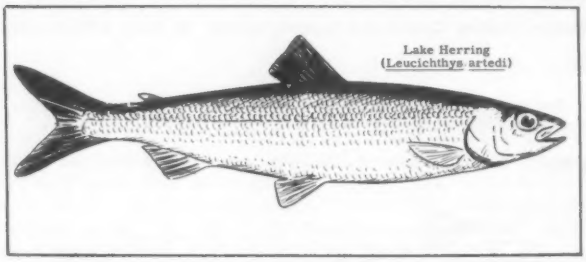
--"Sea Secrets," The Marine Laboratory, University of Miami, Coral Gables, Fla.

COLD STORAGE LIFE OF FRESH-WATER FISH--NO. 3[1/]

(Lake Herring, Northern Pike, and Whitefish)

INTRODUCTION

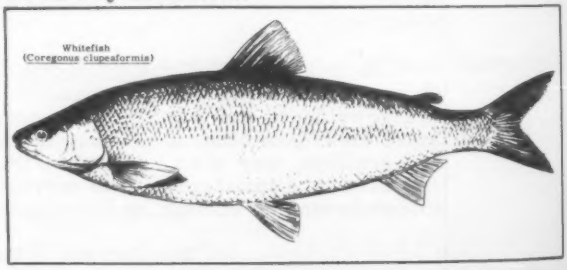
The various species of fresh-water fish constitute a valuable source of high-quality protein food in the United States. Notwithstanding this fact, relatively little is known about the frozen-storage characteristics of these fish. Data on their cold-storage life, if available, would greatly assist the producer in selecting the best handling procedures and in adjusting to fish-marketing changes. The data would also help the sports fishermen to make better use of their catches.



A project designed to evaluate the frozen-storage characteristics of certain species of fresh-water fish was started at the Seattle Technological Laboratory about 5 years ago. The first report of the findings was published in the September 1954 (Myauchi and Stansby 1954); the second, in November 1955 (Osterhaug and Myauchi 1956). In this paper, the results of cold-storage tests on three new species (lake herring, Leucichthys artedi; northern pike, Esox lucius; and whitefish, Coregonus clupeaformis), are reported.

COLLECTION AND TREATMENT OF SAMPLES

The fish used in this study were collected in Minnesota. Samples of the lake herring and of the whitefish were stored in the round as well as in other market forms. The northern pike were stored only as fillets.



Three lots of fish, one for each species studied, were shipped from the point of collection to the Seattle laboratory. The lake herring and the whitefish were shipped frozen, and the northern pike was shipped iced.

The two lots of frozen fish (lake herring and whitefish) were frozen in commercial freezers, packed in suitable containers with dry ice, and shipped to Seattle by express or air freight. The two lots, which were received in good condition, were placed immediately in storage at 0° F.

1/ This work was carried out under a project financed in part by the Refrigeration Research Foundation.

The single lot of iced fish (northern pike) was shipped in the round from Litchfield, Minn., on February 1, 1955, and arrived, well iced, in Seattle on February 3. The fish were held overnight at the laboratory in storage at 34° F. before being filleted and packaged for freezing. The individually cellophane-wrapped fillets were frozen on shelves in a room at -20° F. and then were packed in waxed cartons and stored at 0° F.

RESULTS AND DISCUSSION

Table 1 gives data on the cold-storage history of the three species of fish. Owing to the small samples of fish received the initial zero-storage organoleptic tests of these widely-accepted fish (lake herring and whitefish) were omitted.

Table 1 - Cold-Storage Life of Certain Fresh-Water Fish Stored 0° F.

Description of Sample						Condition of Samples Stored at 0° F. for:				
Common Name	Scientific Name	Source	Date Caught	Method of Shipping	Packaging Used for Storage	3 Months	5 Months	7 Months	9 Months	11 Months
Lake herring (South Shore)	Leucichthys artedi	Lake Superior, (Duluth, Minn.)	Dec. 1, 1954	Frozen	In the round, glazed; packed in 5-pound wax cartons, overwrapped with wax paper heat-sealed.	Firm and bright but with slight reddish discoloration in belly cavities of some fish; some off-flavor.	Texture tender, moist, and firm; bright; flavor bland. (very good)	Texture soft; meat mottled pink with yellow spots near nape; flavor "muddy" or "scorched" (not acceptable)	Rancid (not acceptable)	Rancid (not acceptable)
					Scaled, headed, and gutted; packed in 1-pound cartons; overwrapped with 450 MSI cellophane, heat sealed.	Texture tender and moist; flavor good.	Texture firm; slight discoloration of nape; flavor good. (good)	Texture firm; considerable discoloration of nape; slight off-flavor in nape and belly cavity. (acceptable)	Texture firm; skin had darkened, nape and belly cavity showed yellow discoloration; slight rancidity of nape and belly cavity. (acceptable?)	Rancid (not acceptable)
					Fillets packed in 1-pound waxed cartons, overwrapped with 450 MSI cellophane, heat sealed.	Texture moist and tender; flavor good, similar to lake smelt or silver smelt.	Texture moist and flaky; two fillets had yellow spots on meat; flavor mild with no off-flavors noted. (acceptable)	Some yellow discoloration over surface of fillets; some rancidity noted in dark meat, nape area, and edges of belly cavity. (acceptable)	Texture firm but spongy with excess expressible liquid; surface of meat yellow; some rancidity throughout. (not acceptable)	Rancid (not acceptable)
						1 Month	2 Months	3 Months	4 Months	7 Months
					Breaded fillets packed in 1-pound waxed cartons, overwrapped with 450 MSI cellophane, heat sealed.	Good	Good	Fried fillets had very good flavor. (acceptable)	Two of the baked fillets had a slight rancid flavor. (acceptable)	Skin of baked fillets slightly rancid, meat mild to flat. (acceptable)
						0 Months	3 Months	6 Months	9 Months	12 Months
Northern pike	Esox lucius	Litchfield, Minn.	Feb. 1, 1955	Iced	Fillets, wrapped in MSAT cellophane, packed in waxed carton.	Texture soft; flavor bland.	Texture firm, tender and flaky; meat white; flavor mild and pleasant.	Meat had darkened; some rancidity. (acceptable)	Texture firm; meat had darkened; moderate to strong rancidity. (not acceptable)	Discontinued
Whitefish1/	Coregonus clupeaformis	Red Lake, Minn.	Aug. 15, 1954	Frozen	In the round, packed in polyethylene bags.	-	Variable; sample inadequate in size.	Slight darkening along backbone, no off-flavors or rancidity. (acceptable)	Texture firm; reddish color along backbone and belly wall; some rancidity in fat. (acceptable)	Texture soft; dark meat was brown; slight rancidity in dark meat. (not acceptable)
					Eviscerated, packed in polyethylene bags.	-	-	-	Texture firm, meat white; flavor normal. (acceptable)	No further samples available.
					Fillets, wrapped in MSAT cellophane.	-	Samples not adequate for judging.	Slight darkening around edges and along center line; off-flavors in tail portion and posterior belly flaps; fat slightly rancid. (acceptable)		Texture firm; yellow-brown discoloration; moderate amount of rancidity throughout. (not acceptable)

1/ Zero-month organoleptic tests omitted owing to small size of samples.

The northern pike, which were shipped iced and then filleted before being frozen, remained acceptable through 6 months of frozen storage. By 9 months, the meat had darkened somewhat, and moderate to strong rancidity had developed.

The whitefish were found to be acceptable through 9 months of storage. By 12 months, all of the samples had darkened in color and were slightly to moderately rancid.

The lake herring that had been frozen and stored in the round were judged not to be acceptable at the seventh-month examination, owing to discoloration and autolytic breakdown in the belly cavity. The meat along the belly flaps was strongly mottled from gray to brownish red, with yellowish spots near the nape. There was also a strong tendency for the rib bones to protrude into the belly cavity. Strong "muddy" or "scorched" off-flavors were noted. After 9 months of storage these samples were also rancid.

The lake herring that had been scaled, headed, and gutted before being frozen remained "acceptable" through the ninth-month examination, but they were judged "not acceptable" at 11 months, owing to the development of rancidity. These fish might have had a longer frozen-storage life if the original cleaning of the belly cavity had been more thorough.

Frozen fillets of lake herring remained acceptable through the seventh-month examination, but by the ninth-month examination they had become spongy in texture and somewhat rancid throughout.

Frozen breaded fillets of lake herring remained acceptable through 7 months of storage. No further storage was possible because, at that time, the samples were used up.

FRESH-WATER FISH CURRENTLY UNDERGOING STORAGE TESTS

Because the storage tests reported here are based on only single batches of each species and because many of the variables remained uncontrolled, these results cannot be considered as determining conclusively the storage life of these species. To employ our limited resources more efficiently, we have decided therefore to concentrate on a single species of fish during the coming year and thereby obtain better control of the many variables. The species chosen is lake herring from Lake Superior and Lake Huron. The results of this investigation, when completed, will be given in the next report on this project.

--BY KATHRYN L. OSTERHAUG, FISHERY PRODUCTS TECHNOLOGIST,
FISHERY TECHNOLOGICAL LABORATORY, BRANCH OF COMMERCIAL FISHERIES,
U. S. FISH AND WILDLIFE SERVICE, SEATTLE, WASH.

BIBLIOGRAPHY

Miyauchi, D. T., and Stansby, M. E.
1954. Cold-Storage Life of Fresh-Water Fish--No. 1. Commercial Fisheries Review, vol. 16, no. 9, September, pp. 18-20.

Osterhaug, Kathryn L., and Miyauchi, D. T.
1955. Cold-Storage Life of Fresh-Water Fish--No. 2. (Yellow Perch, Crappie, White Bass, Utah Chub, and Squawfish). Commercial Fisheries Review, vol. 17, no. 11, November, pp. 19-21.

COLD-STORAGE STUDIES ON GULF OF MEXICO YELLOWFIN TUNA

Exploratory studies to anticipate, and possibly forestall, technological problems in the newborn Gulf tuna industry are being conducted. Thirty-nine yellowfin tuna were frozen in brine tanks and in refrigerated dry-wells aboard the fishing vessel or in warehouse freezers ashore. The fish (from 40 to 150 pounds each) were studied by Service technologists, and then were placed in frozen storage. They will be examined at periodic intervals to determine the storage effects, if any, upon the color and flavor of the meat. Individual fish will be processed and canned at inter-

vals during the storage period for studies of the effects of processing after prolonged storage periods.

The tuna were taken by the Service's exploratory fishing vessel Oregon during long-line fishing operations off the delta of the Mississippi River. The cruise, one of many during the past year, was designed to further test the commercial feasibility of a year-round tuna fishery in the Gulf area. A canning expert from the Service's Technological Section supervised preparation of the samples.

FUNGICIDAL PROPERTIES OF MODIFIED UNSATURATED FISH OILS

Comparative studies made at Florida Southern College of the fungicidal activities of inorganic copper salts and of a modified unsaturated fish oil showed the fish oil to be approximately 32 times as active in preventing mold development. The inorganic salts studied (commonly used as fungicidal agents) were copper sulfate and basic copper acetate; the fish oil was modified by chemically uniting it with a quaternary ammonium compound. The work was sponsored by the Service with funds made available by Public Law 466, the Saltonstall-Kennedy Act of 1954. A potentially large field of application for fish oils will be opened if the research is successful.

The comparative degrees of growth of a mold, Candida albicans, in cultures containing the above salts or the modified fish oils were studied. The culture, containing approximately nine ten-thousandths of an ounce of modified unsaturated fish oil per gallon, evidenced no growth of the mold, while those containing much larger quantities of the two copper salts were quickly overgrown with the mold. Further studies are continuing.

Experimental pump and probe disigned to introduce fish oil nematocides into the ground surrounding the roots of citrus trees threatened by the "spreading-decline" nematode.

This work is the result of one phase of a general program dealing with research on the insecticidal, fungicidal, and nematocidal characteristics of fish oils. Results to date have been promising in both the fungicidal and nematocidal fields. Research on the latter field is now out of the laboratory and into the pilot-study phase. Problems of application of the nematocidal fish oils to nematodes in the underground roots of citrus trees are being studied.

Note: See Commercial Fisheries Review, March 1956, p. 9; June 1956, p. 13.

NORTH ATLANTIC SHRIMP KEEPING QUALITY IN COLD STORAGE

Gulf of Maine or Northern shrimp were found to have good keeping quality when brine-frozen with heads on aboard the Service's exploratory fishing vessel Delaware, and then ashore thawed, processed, packaged, refrozen, and stored at 0° F. under conditions approximately equivalent to commercial practice. The samples were considered of "commercially-acceptable" quality after 14 months' storage (the period of the last examination).

On June 6, 1955, supplies of Northern shrimp, Pandalus borealis (average heads-on length 3.5 inches) were caught by the research vessel during exploratory fishing operations in North Atlantic waters. These were promptly brine-frozen with heads on at 0° to 5° F. aboard the vessel and stored at about 5° F. in the fish hold. Sample lots of the frozen shrimp, after landing, were distributed to local processors for evaluation. A small representative lot was processed for storage tests at the laboratory.

The samples were prepared for storage as follows: the thawed shrimp were beheaded; washed in fresh water; packed in waxed cardboard cartons (5-lb. size); and refrozen in a plate freezer at -20° F. The carton lids were then removed, and the shrimp were glazed by dipping twice in water at 32° to 35° F.; after which the lids were replaced. The cartons were overwrapped with aluminum foil and finally with kraft wrapping paper to protect the foil. The packages were stored at 0° F.

Organoleptic observations of the raw and cooked shrimp were carried out at periodic intervals. The shrimp showed a white mottling of the shell which was believed due to local dehydration resulting from the brine-freezing operation. This detracted somewhat from the appearance but was not considered serious by those examiners who understood the nature of the spotting. The periodic examinations revealed the following:

INITIAL EXAMINATION: Color was a pleasing light pink; flavor was mild, pleasing, and sweet, and the texture was tender. Over-all rating was "like very much."

SIX MONTHS' STORAGE: Color was a good pink but slightly dull. Flavor was considered to be good with no off-flavors, and the texture was firm. Over-all rating was "like moderately."

NINE MONTHS' STORAGE: Color was fair, but there was some slight yellowing; flavor was fair, lacking the characteristic sweet flavor, but with discernible off-flavors; texture was firm and approaching the slightly tough stage. Over-all rating was between "like slightly" and "like moderately." (The rating "like slightly" is considered to be the lower limit of commercial acceptability.)

FOURTEEN MONTHS' STORAGE: Color was fair, showing slight yellowing; flavor was fair, lacking the characteristic sweet flavor, but with no discernible off-flavors; texture was satisfactory, but appeared to have become softer. Over-all rating was between "like slightly" and "like moderately."

TECHNICAL NOTE NO. 34 - GROWTH CHARACTERISTICS OF THE PINK YEAST THAT CAUSES DISCOLORATION OF OYSTERS

Oysters of the finest grade and free of defects when packaged were found to have pink spots after being held in frozen storage for various periods of time and then thawed, and the thaw liquor was found to have a pink color. A study was undertaken to determine the cause of this phenomenon. The literature indicated that the agent causing the pink discoloration is a supposedly asporogenous yeast belonging to the genus Torulaceae. The work reported here, however, showed that the pink yeast may produce ascospores.

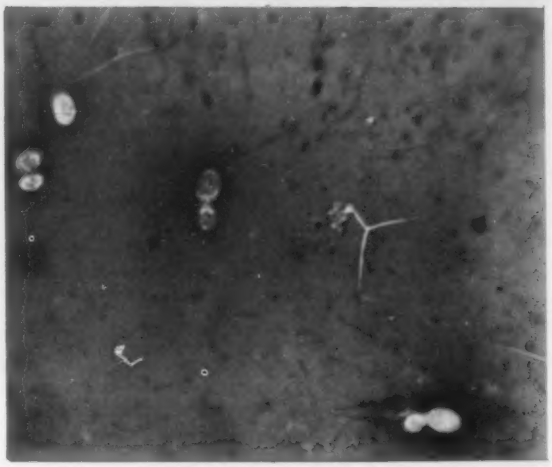


Fig. 1 - Pink yeast culture showing asci and ascopores.

EXPERIMENTAL

A representative sample consisting of four oysters with pink spots was thawed, removed from the package, and blendored in a sterile Waring Blendor jar. The resulting disintegrated homogeneous material was used to inoculate tubes of Sabouraud's broth media. Subsequently, Sabouraud's agar plates, to which had been added one drop of sterile 50-percent lactic acid prior to pouring the agar, were streaked from the growth that developed in the broth tubes. (The lactic acid reduces the overgrowth of colorless colonies that interferes with the growth of the pink yeast. The organism causing this growth is a gram positive rod that possibly may become chromogenic under proper conditions.) After 3 to 4 days of incubation at room temperature, pink colonies appeared on the plates.

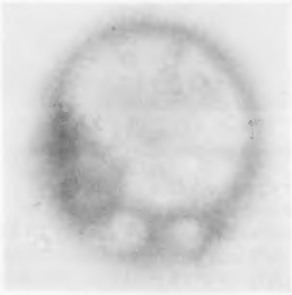


Fig. 2 - An ascus with ascopores enclosed in sac.

These colonies were confluent, shiny, butyrous, and pink; and a few were discrete. A smear made from a colony, after being stained with methylene blue and examined under oil immersion, showed yeast cells, some of which were budding. Fresh preparations were studied under the microscope over the period of an hour or two--depending upon the evaporation of the media--and each ascus[1/] was noted to contain from one to four ascospores.[2/] Seven to eight transfers were made of the cultures, and each showed the same characteristics of growth, indicating that each was pure. The final culture was then allowed to remain undisturbed at room temperature on a Sabouraud's agar slant for 4 years[3/] in large test tubes that were tightly sealed.

After this long dormant period, the culture was examined for the presence of spores by the method of Dorner, as is recommended in the Manual of Methods for

1/ Ascus--the membranous oval or tubular spore sac in ascomycetes.
2/ Ascospore--one of the spores contained in an ascus.
3/ This long period of time was made necessary by work on other projects.

Pure Culture Study of Bacteria. Ink Powder (Nigrosin Electroencephalograph) was used for the counterstain (pure nigrosin powder was not available). Microscopic examination showed that the culture contained asci, each of which had from one to four ascospores (fig. 1 and 2).

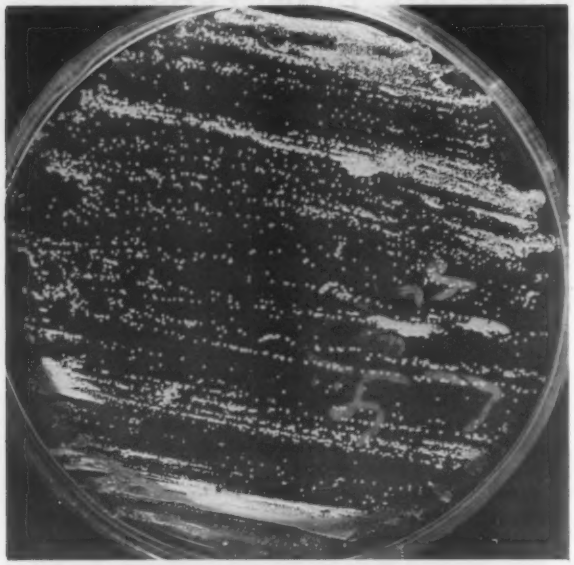


Fig. 3 - Pink yeast growing on a plate of Sabouraud's agar.

To determine if these 4-year-old cultures could still be revived, I inoculated Sabouraud's broth tubes with them. The pink yeast colonies grew satisfactorily (fig. 3); the surface contour of the cells appeared to be normal (fig. 4); and the cells were found to bud normally, and no spores were present (fig. 5).

DISCUSSION

It was noted about 6 years ago that pink yeast would grow and form pigment at temperatures down to -35° F. (McCormack 1950). Since that time, there has been a great increase in the quantity of oysters held under frozen storage, with some evidence of a higher incidence of losses due to pink yeast. During the early part of the present oyster season, for example, there was considerable concern over the problem of colored oysters.

Fig. 4 - The surface contours of pink yeast cells appear normal.

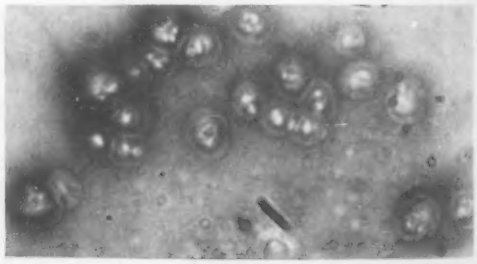


Fig. 5 - A culture showing budding cells but no spores.

The facts reported here that pink yeast produces spores suggest that the avenues of contamination are likely to be much more numerous than was formerly believed when only the vegetative form of the organism was studied by itself. On the basis of our present incomplete knowledge, however, we can conclude only that there is greater need for further research on this and other causes of pink and red color in shucked oysters.

--BY GRACE McCORMACK, FORMERLY BACTERIOLOGIST,
FISHERY TECHNOLOGICAL LABORATORY,
U. S. FISH AND WILDLIFE SERVICE, COLLEGE PARK, MD.
NOW BACTERIOLOGIST, VETERANS ADMINISTRATION HOSPITAL,
CANANDAIGUA, N. Y.

BIBLIOGRAPHY

Committee on Bacteriological Techniques
1932-1950. Manual of Methods for Pure Culture Study of Bacteria. Society of American Bacteriologists, Geneva, New York.

Henrici, Arthur T.
1930. Molds, Yeasts, and Actinomycets. John Wiley and Sons, New York, N. Y., pp. 200-201.

McCormack, Grace
1950. Technical Note No. 5--"Pink Yeast" Isolated From Oysters Grows at Temperatures Below Freezing. Commercial Fisheries Review, vol. 12, no. 11a, November, p. 28.

Skinner, Charles E.; Emmons, Chester W.; Tsucheya, Henry M.
1947. Henrici's Molds, Yeasts, and Actinomycets. Second edition, John Wiley and Sons, New York, N. Y., p. 302.

FROZEN FISH FILLETS AND STEAKS IDEAL PROTEIN FOODS

Frozen ocean perch, cod, and haddock fillets, and halibut steaks are recommended by the U. S. Fish and Wildlife Service as ideal protein foods.

Fillets are the sides of the fish cut lengthwise away from the backbone. They are practically boneless and have little or no waste. Steaks are cross-section slices of the larger sizes of dressed fish, usually about $\frac{3}{4}$ of an inch thick.

Frozen fillets and steaks may be thawed prior to cooking. Normally, it is suggested that they be thawed overnight in the refrigerator or left at room temperature for 3 to 4 hours. However, if you're in a hurry, the fillets or steaks may be cooked without thawing if additional cooking time is allowed.

Fillets or steaks may be prepared by any of the basic cooking methods of frying, baking, broiling, and steaming, or in an endless variety of combination dishes.

The important thing to remember in cooking fish, however, is that it must not be overcooked. Just enough cooking for the meat to flake easily will leave the fish moist and tender and bring out the delicate flavor.

The home economists of the Fish and Wildlife Service recommend Ocean Perch Creole as a delectable but economical and easily-prepared protein dish.

OCEAN PERCH CREOLE

- 2 POUNDS OCEAN PERCH FILLETS
- $\frac{1}{4}$ CUP BUTTER OR OTHER FAT
- 2 TABLESPOONS FLOUR
- 2 CUPS TOMATO JUICE
- 2 TABLESPOONS CHOPPED ONION
- 3 TABLESPOONS CHOPPED PIMIENTO
- $\frac{1}{2}$ TEASPOON SALT
- DASH PEPPER
- RICE RING

Skin fillets and cut into one-inch pieces. Melt butter, blend in flour and add all remaining ingredients except rice. Cook, stirring occasionally, about 15 minutes or until fish flakes easily when tested with fork. Serve hot in rice ring. Serve 6.

TRENDS AND DEVELOPMENTS

California

1956/57 SARDINE SEASON OFF TO A GOOD START: The total catch of the sardine purse-seine fleet in Southern California through October 19 totaled 23,000 short tons, or 240 percent more than the 6,750 tons landed as of the same date in 1955. However, fishing out of San Pedro in 1955 did not start until November 7, according to a report from the Service's Market News Reporter in San Pedro.

The catch during the night of October 16, the last night of the recent series of dark nights, amounted to 5,500 tons, the best single night's fishing since the night of October 5, 1951, when 7,460 tons were caught. The big catches of October 16 were due to successful scouting by airplanes and the fact that the fleet concentrated near the huge schools located between Del Mar and La Jolla. Of the 75 vessels fishing in that area, one vessel made an all-time record catch for a San Pedro vessel of 230 tons and 27 other purse seiners had catches of over 100 tons each.

Both the fishermen and the canners seem to be satisfied with the ex-vessel price of $47.50 a ton, and canners are willing to take all the sardines landed. Market conditions appear favorable for the canned sardine pack and present indications are that the catch for the 1956/57 fishing season may equal or exceed the73,000 tons caught in the 1955/56 season.

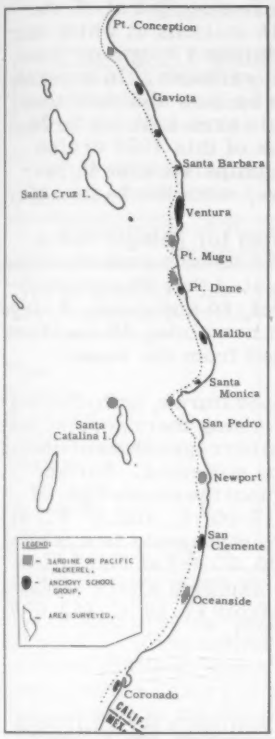
* * * * *

PERIODIC FLIGHTS TO STUDY PELAGIC FISH DISTRIBUTION (Airplane Spotting Flight 56-7): In order (1) to study pelagic fish distribution, abundance, and behavior in southern California, (2) to become familiar with airplane landing fields and facilities in northern and central Baja California, and (3) to locate areas of fish concentration, the California Department of Fish and Game Cessna 1359D conducted a flight August 22-28, 1956. The inshore area between Pt. Conception, Calif., to Turtle Bay, Baja California, was surveyed.

In southern California (Pt. Conception to San Diego) Pacific mackerel and sardine schools increased in abundance in the inshore area since June 1956 and conversely anchovies decreased in abundance. Commercial fishing operations revealed the presence of sardine and Pacific mackerel schools around the offshore islands but these areas could not be covered on this flight.

Anchovy: As in June, the largest concentration of anchovies appeared in the Pt. Pitas-Ventura regions. In all areas, except near Gaviota, there was a decrease in anchovy concentration since the last flight in June. A total of 550 anchovy schools (5,818,900 square feet of fish) were observed from Gaviota to Coronado, with the largest concentration in the Pt. Pitas-Ventura region.

Sardine and Pacific Mackerel: Schools of Pacific mackerel appear to be more abundant this season than in the past several seasons. Pacific mackerel schools were observed in the Laguna, Newport, and Oceanside areas and were also reported around the offshore islands.



Airplane spotting flight 56-7
(August 22-23, 1956)

Sardine schools were observed near Pt. Conception, Pt. Mugu, Pt. Dume, and in the Oceanside region. It is still too early to estimate comparative abundance with past seasons but it appears that the distributional pattern is remaining quite similar to that of 1955.

A total of 59 sardine schools (445,000 square feet of fish), 22 Pacific mackerel schools (124,100 square feet of fish), and 87 mixed sardine-Pacific mackerel schools (422,800 square feet of fish) were observed from Pt. Conception to Oceanside.

Airplane spotting flight 56-7
(August 25-28, 1956)

The purpose of the Baja California scouting was to locate areas of fish concentration and to survey airplane landing fields and facilities. No attempt was made to count and measure schools of fish observed. The section of coast between the California-Mexico border and Ensenada contained several small school groups of "flashing" fish that were probably sardines or Pacific mackeral or both. Anchovies were present in Ensenada Bay, but in fewer numbers than in June. No fish schools were seen in the area between Ensenada and Cape Colnett. The area between Cape Colnett and Sacramento Reef contained an almost continuous band of anchovy schools close to the beach. Many more anchovy schools were present in this area than previously observed in Baja California.

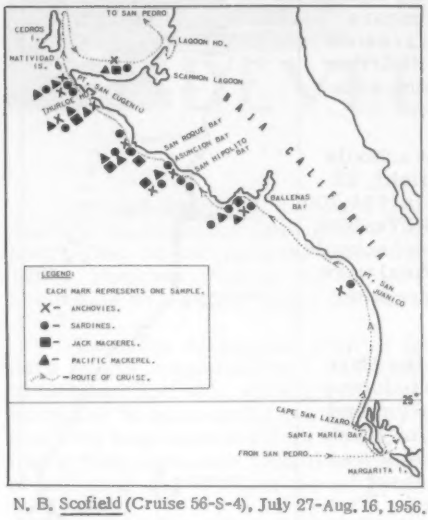
From Sacramento Reef to Lagoon Head, Sebastian Vizcaino Bay, there were several small schools scattered along the coast. These schools were probably sardines but good identification was not possible. From Lagoon Head to Pt. Eugenio many schools of sardines were observed. All these schools were small crescent-shaped surface schools.

Many small schools of unknown identity were observed in the area from Pt. Eugenio to Turtle Bay.

* * * * *

SURVEY BY "N. B. SCOFIELD" TO ASSESS RELATIVE ABUNDANCE OF SARDINES (Cruise 56-S-4): This was the first of the 1956 survey cruises designed to assess the relative abundance of sardines resulting from the 1956 spawning and the relative abundance of older sardines, Pacific mackerel, and jack mackerel. Since the M/V Yellowfin has been taken out of service, this and subsequent 1956 survey cruises will be carried out by the research vessel N. B. Scofield of the California Department of Fish and Game. The vessel, which sailed July 27 and returned August 16 to Los Angeles Harbor, worked along the coast of Baja California from Point Eugenia to Magdalena Bay and the area on the east side of Cedros Island.

A total of 61 light stations were occupied. Sardines were sampled at 16 stations, Pacific mackerel at 11, jack mackerel at 6. Of the 16 stations at which sardines were taken, 14 yielded 1956 spawned fish (125 mm. standard length or less), and five yielded adult sardines. In general, sardines appeared to be less abundant than the 1955 survey of this area indicated--28 percent of all stations of this 1956 cruise yielded sardines as compared with 45 percent of the 1955 survey over the same area.



N. B. Scofield (Cruise 56-S-4), July 27-Aug. 16, 1956.

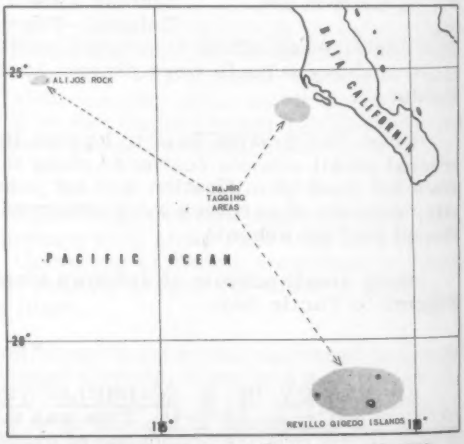
The vessel scouted for pelagic fish a total of 368 miles; 216 schools were observed, of which it was estimated that 20 contained sardines, 20 mackerel, 80 anchovies, 8 large tunalike fish, and the remaining 88 could not be positively identified from the vessel.

Sea surface temperatures, bathythermograph casts, and reversing thermometer casts were taken at each station regardless of whether fish were observed or collected. Surface temperatures throughout the cruise ranged from a minimum of 17.10° C. (62.8° F.) at two miles south of Point Eugenia to a maximum of 26.90° C. (80.4° F.) at Magdallena Bay. Sardines were sampled where surface temperatures ranged from 17.10° C. (62.8° F.) to 26.89° C. (80.4° F.).

* * * * *

YELLOWFIN AND SKIPJACK TUNA TAGGED AND MEASURED BY CLIPPER "ELSINORE" (Cruise 56-C-4): Tagging and measuring yellowfin and skipjack tuna were the principal objectives of the tuna clipper Elsinore during a cruise conducted by the California Department of Fish and Game. The vessel sailed on July 21, 1956, and returned to San Diego August 18, 1956.

During this cruise 26 yellowfin and 767 skipjack tuna were tagged. To test the effect of color on recovery, tags of three different colors in sequences of five each were used. Nine night-light stations were occupied. Seven series of measurements were made of seven separate schools of tuna (six skipjack and one yellowfin tuna). A total of 43 bottles and 15 packages of frozen specimens were collected. These specimens are presently being analyzed. Limited oceanographic observations were also made.



M/V Elsinore tuna tagging (July 21 to Aug. 18, 1956).

Canned Fish Consumer Preference Study

TUNA MOST POPULAR CANNED FISH: Canned tuna was served at least once during the 12 months prior to July 1, 1956, in 76 percent of all households in the United States. Canned salmon was served in 69 percent, and sardines in 50 percent of the households.

The relative ranking of these three species of fish varies somewhat among regions. Canned tuna was most popular in the West, being served in approximately 88 percent of the homes. Canned salmon was most frequently used in the North Central region where it was more popular than canned tuna, 75 percent to 72 percent, respectively. Canned sardines were used most often in the South where 55 percent of the housewives served them.

Percentage of Households Serving Canned Fishery Products, July 1955-June 1956

Type of Canned Fishery Products Served	Regions				
	U. S. Total	North east	North Central	South	West
	(Percent 1/)				
Tuna	76.1	83.4	71.7	68.9	87.7
Salmon	68.8	59.7	75.4	73.6	62.1
Sardines	50.3	45.9	51.1	54.6	47.8
Shrimp	24.0	26.6	19.4	15.9	46.5
Oysters	22.5	14.2	25.3	22.5	32.6
Crab meat	16.7	26.4	7.1	12.9	26.9
Mackerel	10.0	5.0	9.6	17.3	4.2
Clams	8.2	12.3	2.6	4.0	21.1
No. of Households	2,770	734	805	848	383

1/ Percentages total to more than 100 because respondents served more than one product.

Canned shrimp and canned oysters were less widely distributed, with each being served in about 23 percent of the homes on a national basis. The percentage of families using both of these shellfish items was greatest in the West. The use of canned shrimp was lowest in the South (16 percent), while the serving of canned oysters was lowest (14 percent) in the Northeast.

These findings are based on a June 1956 scientific sample survey of 2,700 households distributed throughout the United States. These data on percentage of households serving various kinds of canned fish and shellfish are one part of a large amount of other data obtained on household consumers' preferences for canned fish and shellfish.

Final results of the survey, which is being financed by funds made available by the Saltonstall-Kennedy Act of 1954, are scheduled for publication the early part of 1957. The U. S. Fish and Wildlife Service contracted with the W. R. Simmons and Associates Research, Inc., of New York City to conduct the survey.

Note: Also see Commercial Fisheries Review, August 1956, p. 47.

* * * * *

CANNED TUNA PACKED IN OIL PREFERRED BY HOUSEWIVES: At least nine out of every ten housewives (91 percent) in the United States who buy canned tuna usually purchase tuna packed in oil. Approximately seven percent buy tuna packed in brine and two percent are not aware which type they usually purchase.

A large majority (88 percent) of those housewives who served tuna indicated they had never tasted canned tuna in brine although it has been rather widely distributed in recent years. When asked "If the price were the same for canned tuna packed in oil or in brine, which one would you buy?" sixty-six percent indicated tuna in oil and seven percent indicated tuna in brine. Another twenty-seven percent were not sure which they would prefer. Even though the latter undecided group appears to be housewives usually buying canned tuna-in-oil, a substantial majority of housewives using canned tuna-in-oil desire that product exclusively.

This conclusion is based on opinions given in this survey and is not the result of actual product testing.

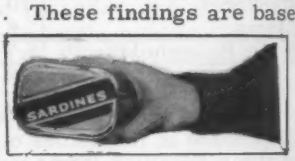
The preference for tuna in oil was highest in the West and South and diminished slightly in the Northeast and North Central regions.

These findings are based on a June 1956 scientific sample survey of 2,700 households distributed throughout the United States. This study of type of pack preferences for canned tuna is one part of a broader study of household consumers' preferences for all canned fish and shellfish.

Final results of the survey, which is being financed by funds made available by the Saltonstall-Kennedy Act of 1954 to help the domestic fishing industry increase the demand for fishery products, are scheduled for publication the early part of next year. The U. S. Fish and Wildlife Service contracted with W. R. Simmons and Associates Research, Inc., of New York City to conduct the survey.

* * * * *

CANNED SARDINES PURCHASED TWO OR MORE CANS AT A TIME: Eight out of ten housewives who purchase canned sardines buy two or more cans at a time. More than 33 percent of the housewives usually purchase two cans. Another 20 percent indicate that they usually buy in units of three. These findings are based on a scientific sample survey of household consumers' preferences for canned fish and shellfish conducted in June 1956 among 2,700 households distributed throughout the United States.



The large number of purchases (81 percent) of more than one can of sardines at a time may be due partially to the pricing policy of retail stores and other factors. No attempt was made in this study to ascertain the effect of such factors on the purchasing pattern.

The tendency toward two-can purchases was almost consistently reported throughout the four geographic regions of the United States.

Table 1 - Percentage of Homemakers Purchasing Canned Sardines, by Number of Cans Purchased at One Time and by Regions

	Regions				
	U. S. Total	Northeast	North Central	South	West
	(Percent)				
Number of Cans:					
One can	19.3	19.3	20.3	14.2	29.7
Two cans	33.4	40.1	31.8	30.2	33.0
Three cans	20.2	17.8	24.1	21.4	13.2
Four cans	12.4	11.7	10.4	14.9	11.5
Five or more cans	13.0	9.9	12.4	17.3	9.3
Don't know	1.7	1.2	1.0	2.0	3.3
Total	100.0	100.0	100.0	100.0	100.0
Weighted base (number of households which served canned sardines within the last 12 months)	(1,394)	(337)	(411)	(463)	(183)

Information on the purchasing habits of homemakers may serve as a basis for packaging cans of sardines in handy containers holding more than one can.

This study on sardine purchasing practices is one part of a broader study of household consumers' preferences for canned fish and shellfish. Final results of the survey, which is being financed by funds made available by the Saltonstall-Kennedy Act of 1954, are scheduled for publication the early part of next year. The U. S. Fish and Wildlife Service contracted with W. R. Simmons and Associates Research, Inc., of New York City to conduct the survey.

* * * * *

DEVEINED CANNED SHRIMP PREFERRED BY CONSUMERS: Shrimp which has been peeled and deveined before canning is preferred by a majority of the consumers who buy canned shrimp, according to a recent scientific sample survey of 2,700 households in the United States. Of the housewives that usually buy shrimp, 59 percent buy the peeled and deveined canned shrimp, while only 32 percent buy the regular peeled but not deveined pack. The remaining 9 percent either had no preference or did not know the type of canned shrimp they usually purchase.

Table 1 - Percentage of Consumer Purchases of Canned Shrimp by Area and Type of Pack

	Regions				
	U.S. Total	North-east	North Central	South	West
Number of Households	664	195	156	135	178
	(Percent)				
Households serving canned shrimp within last 12 months	100.0	100.0	100.0	100.0	100.0
Type of Pack Purchased:					
Cleaned (deveined)	59.4	68.3	64.5	49.3	53.4
Regular (not deveined)	31.6	24.3	28.4	34.3	39.8
No preference	5.0	6.8	2.6	8.2	2.8
Don't know	4.0	0.6	4.5	8.2	4.0

On a regional basis, the preference for deveined shrimp was most pronounced in the Northeast Area where it was preferred by more than 2 out of every 3 users of canned shrimp.

This study on consumers' preferences for canned shrimp is one part of a more general study on household consumers' preferences for canned fish and shellfish conducted in June 1956.

Final results of the survey, which is being financed by funds made available by the Saltonstall-Kennedy Act of 1954, are scheduled for publication the early part of next year. The U. S. Fish and Wildlife Service contracted with W. R. Simmons and Associates Research, Inc., of New York City to conduct the survey.

Cans--Shipments for Fishery Products, January-July 1956

Total shipments of metal cans during January-July amounted to 65,120 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 55,195 tons in the same period of 1955. The increase in this year's shipments is due largely to the heavier pack of canned tuna as compared with the January-July 1955 period (when production was curtailed due to oversupply) and also the increase in the pack of Maine sardines.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.

Customs Simplification Act of 1956 Analyzed

The third customs simplification bill (H. R. 6040) was signed by the President on August 2. It will be known as the Customs Simplification Act of 1956 (Public Law 927, 84th Congress). A short analysis of the new law as it appeared in the August 13 Foreign Commerce Weekly follows:

The principal change embodied in this act is in the method of determining the value of the imported goods which are subject to ad valorem duties. In general, the primary basis for determining their dutiable valuation is to be the "export value" of goods. This is to replace the present system, which calls for ascertaining the "foreign value" of the product in question--the price at which it is sold in the country of origin--as well as the "export value," and for the duty to be calculated upon the higher of the two.

Under the amended form of the bill as finally enacted, however, the new system is not to apply to that small fraction of ad valorem imports on which the Treasury finds that the dutiable value would be reduced by 5 percent or more. Consequently, the new valuation provision does not come into effect for any imports until a final list of those exceptional articles is established.

The Bureau of Customs at Washington has started work on a preliminary list of those articles the dutiable value of which would be reduced by 5 percent or more. That list will be published in the Federal Register and in the Weekly Treasury Decisions. Interested businessmen then will have 60 days to suggest reasons for their belief that specified additions should be made to the preliminary list, which will be investigated by Treasury before the final list of exceptions is issued.

For goods subject to ad valorem duties other than those included on the final list of exceptions, the general change in the basis of valuation is to become effective on entries for consumption beginning the thirtieth day following the publication of that final list.

Other than dutiable valuation, the only change of direct commercial interest is with regard to conversion of a foreign currency into U. S. dollars for customs purposes. In general, the Secretary of the Treasury is authorized to use for the entire quarter of a year that rate of exchange which is first certified for that quarter by the Federal Reserve Bank of New York, unless the rate on any particular day varies from that certified rate by more than 5 percent.

Most of the act's other sections deal with obsolete provisions of customs law which the Treasury regarded desirable to have repealed.

Federal Aid Funds Apportioned to States for Sport Fish and Wildlife Restoration Work

State programs to restore and develop the sport fishery and wildlife resources in the 48 states will move at an accelerated pace during fiscal year 1957 with a foundation of $21,062,000 in Federal aid funds, the Secretary of the Interior announced October 7, 1956. This is about $2 million more than in 1956.

On the basis of one dollar from the state for every three of Federal funds, $28,083,000 will be available to state conservation departments for their restoration programs during fiscal year 1957.

The combined Federal Aid in Fish and Wildlife Restoration program is administered by the Fish and Wildlife Service under the terms of the Pittman-Robertson Act for wildlife and the Dingell-Johnson Act for sport fishing. As prescribed in the two Acts, investments are made in restoration activities so that benefits will go to the hunters and anglers who seek recreation and food from the Nation's fields and streams.

This year the various state fish and game departments will receive $16,236,000 for their wildlife restoration projects and $4,826,000 for their sport fishery activities.

The amount available for sport fishery projects represents a drop of $101,400 below the 1956 total of $4,927,400.

The revenue for the Federal share of the sport-fish restoration program comes from the 10-percent excise tax on fishing rods, creels, reels, artificial lures, baits, and flies, paid by the manufacturers of these products. Collections from this source during the year ended June 30, 1956, amounted to $5,149,918. From this total is taken the annual apportionments of $75,000 to Alaska, $25,000 to Hawaii, $10,000 each to Puerto Rico and the Virgin Islands, and the cost of administering the Act by the U. S. Fish and Wildlife Service.

Apportionments of Federal Aid Funds to States for Sport Fishing and Wildlife, Fiscal Year 1957

State	Sport Fishing	Wildlife
Alabama	$ 66,666.23	$287,788.29
Arizona	84,628.46	361,637.73
Arkansas	91,850.01	277,294.93
California	241,300.00	777,565.54
Colorado	113,759.81	485,842.98
Connecticut	48,260.00	81,180.00
Delaware	48,260.00	81,180.00
Florida	94,200.28	227,370.97
Georgia	101,101.06	401,083.13
Idaho	84,885.44	330,805.48
Illinois	170,857.14	446,687.62
Indiana	118,403.23	355,643.56
Iowa	96,156.64	351,096.20
Kansas	79,415.49	326,022.58
Kentucky	86,116.99	252,880.49
Louisiana	62,360.98	268,480.05
Maine	52,533.56	189,789.26
Maryland	48,260.00	108,447.85
Massachusetts	48,260.00	90,494.35
Michigan	241,300.00	811,800.00
Minnesota	241,300.00	507,335.81
Mississippi	52,494.07	239,533.43
Missouri	131,570.42	369,988.96
Montana	114,342.85	494,980.53
Nebraska	78,841.23	308,928.94
Nevada	68,888.10	315,453.71
New Hampshire	48,260.00	81,180.00
New Jersey	48,260.00	121,636.01
New Mexico	81,346.07	371,304.37
New York	157,763.52	670,174.92
North Carolina	82,053.76	339,320.34
North Dakota	50,859.24	248,832.20
Ohio	162,996.28	475,076.23
Oklahoma	103,394.13	287,483.11
Oregon	103,599.65	410,673.56
Pennsylvania	141,976.16	638,190.89
Rhode Island	48,260.00	81,180.00
South Carolina	69,354.44	174,306.71
South Dakota	63,949.04	303,717.90
Tennessee	140,219.71	355,843.83
Texas	220,773.17	811,800.00
Utah	73,599.13	322,936.60
Vermont	48,260.00	81,180.00
Virginia	81,849.34	325,287.43
Washington	97,344.46	349,256.80
West Virginia	48,260.00	213,517.95
Wisconsin	207,390.99	486,128.61
Wyoming	80,218.92	337,660.15

Federal Purchases of Fishery Products

PORTIONS INCLUDED IN FRESH OR FROZEN FISH FEDERAL SPECIFICATION: The Army Quartermaster Corps has announced a revision, effective October 1, 1956, of Federal Specification PP-F-381d "Fish; Fresh (Chilled) and Frozen," to include formed fish portions as an item for purchase by the Armed Forces.

The revision may well result in an expansion of production by the domestic fish fillet block industry to supply the $4\frac{3}{4}$-ounce (3 inches by $3\frac{3}{4}$ inch) portions now allowed for purchase. In the announcement of the specification revision the Quartermaster Corps stated that on any contracts awarded for fish portions, the contractor agrees that there will be delivered only such unmanufactured articles, materials and supplies as have been mined or produced in the United States, and only such manufactured supplies as have been manufactured in the United States substantially all from supplies mined, produced or manufactured, as the case may be, in the United States.

Though the specifications require the size portions indicated for use by the Armed Forces, the domestic fish block producer can supply sizes suited to other specific needs. For example, school-lunch (Type A) portions usually contain two ounces of cooked fish protein. Institutional purchasers of fish portions usually specify that the product be four ounces in weight.

The following is a quotation from the notice of revision:

"When F.S. PP-F-381d, "Fish; Fresh (Chilled) and Frozen," 3 Sept 54, is cited in this contract, the following changes to the specification will apply:

(1) Page 1, paragraph 1.3 add the following: Form VI - Portions."

(2) Page 4. Add the following paragraph: "3.3.2.6. Form VI. - Portions shall be prepared from fresh skinless fish fillets handled in the applicable manner specified in 3.3.1 and 3.3.2. The skinless fillets shall be formed into: (a) portions measuring 3 by $3\frac{3}{4}$ by $\frac{3}{4}$ inches (approximately $4\frac{3}{4}$ ounces) or (b) into portioned blocks measuring

9 by 3¼ by ¾ inches and scored on the top and bottom surfaces into 3 equal portions of the length (every 3 inches), or other sizes or portions or portioned blocks as specified. In the frozen portioned block, the portions shall remain attached at the location of the score by the remaining attached strip (about ⅛-inch thick) of frozen fish so that the portions can be easily separated by bending the blocks. The portions shall be handled and processed in such a manner that they will effect a solid piece of fish flesh, and the pieces of fish comprising the portions will not fall apart or disintegrate when cut, thawed, or cooked."

(3) Page 9. Add the following paragraph: "7.2.4.3. Form VI, Portions. Portions of portioned blocks shall be wrapped in approximately 1-, 5-, or 10-pound units. The product shall be completely wrapped in a prefabricated bag. When more than 1 portion or portioned block is inclosed in the bag, the layers shall be separated by a wax paper insert. The wrapper shall be processed by vacuum, pressure, or heat, or a combination of these conditions so that the wrapper forms a tight, close fit conforming to the surface of the product. The bag shall be string-tied, heat-sealed, secured with pressure-sensitive tape, or closed with suitable metal clips. The bag shall be made of one of the following materials: (a) Polyethylene, not less than .0015 inch thick and having an area yield of not more than 21,500 square inches per pound, (b) A film formed by copolymerizing vinylidene chloride and vinyl chloride. The film shall be not less than .0015 inch thick. For domestic shipment, the packaged product shall be packed in accordance with 5.2. For overseas shipment, not more than 60 pounds of the product shall be packed in accordance with 7.2.5.2."

* * * * *

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPARTMENT OF DEFENSE, AUGUST 1956: The Army Quartermaster Corps in August 1956 purchased 2,860,000 pounds (value $1,403,000) of fresh and frozen fishery products for the use of U. S. Army, Navy, Marine Corps, and Air Force. This was 10.2 percent less in quantity and 15.1 percent less in value than the purchases in July 1956 and 23.2 percent more in quantity and 36.3 more in value than purchases in August 1955.

Purchases of Fresh and Frozen Fishery Products by Department of Defense (August and the First Eight Months of 1956 With Comparisons

QUANTITY				VALUE			
August		Jan.-Aug.		August		Jan.-Aug.	
1956	1955	1956	1955	1956	1955	1956	1955
..... (1,000 Lbs.)				..... ($1,000)			
2,860	2,322	18,275	17,458	1,403	1,030	9,108	7,470

Purchases of fresh and frozen fishery products during the first eight months of 1956 totaled 18,275,000 pounds valued at $9,108,000--4.7 percent more in quantity and 21.9 percent more in value than purchases for the similar period in 1955.

Prices paid for these fishery products by the Department of Defense in August averaged 49.1 cents a pound as compared with 50.7 cents the previous months and 44.3 cents a pound in August 1955.

In addition to the purchases of fresh and frozen fishery products reported, the Armed Forces make some local purchases which are not included above. Therefore, actual purchases are higher than indicated, but is not possible to obtain data on the local purchases by military installations throughout the country.

Fish and Wildlife Motif on United States Postage Stamps

The third and last (king salmon) of three stamps issued this year to emphasize the importance of wildlife conservation in America was released at Seattle, Wash., on November 9, 1956.

The original drawing which was used for the king salmon 3-cent stamp.

The king salmon, which is the subject of the third stamp, offers an outstanding example of the conservation work being carried on by Federal and state governments. King salmon continue to be very valuable commercial and sport fish in the United States and Alaska and they have been aided in their spawning migration upstream by fish ladders and elevators, and by elimination of logjams and high waterfalls.

The stamp is 0.84 by 1.44 inches in dimension, arranged horizontally with a single outline frame, printed by the rotary process, electric-eye perforated, and issued in sheets of 50. The color of the stamp is green. The printing of 120,000,000 3-cent king salmon stamps was authorized.

The design depicts king salmon on their annual migration upstream to the spawning ground.

Fish and Wildlife Service

RESEARCH HELPS BRING TOP-QUALITY FISH CLOSER TO CONSUMER'S TABLE: Through research the U. S. Fish and Wildlife Service is pointing up new market goals for the fishing industry, and through technology it is showing ways to move more efficiently ocean-fresh fish to the consumer's table.

Among the possible marketing goals which Service efforts are bringing into focus for the fishing industry are such things as:

A total of 182,000 eating places which do not now serve fish or shellfish;

"Inland U. S. A." where the per capita fish consumption is well below the seaboard average;

The more than 10,000 frozen-food locker plants in the country, many of which do not have fish among the products available for locker customers;

A large but yet indefinite field of in-plant eating places (such as cafeterias in big assembly plants) which is now being studied;

The field of public institutions which is now being studied to determine which ones offer good markets for fish, and the school-lunch program which the Fish and Wildlife Service has aided for years to the mutual betterment of the school child and the industry;

And the largest field of all, the millions of American housewives who daily plan the meals for the family--a field rich in possibilities for greater sales of fish and fish products and a field which is now being given serious and scientific study by the Fish and Wildlife Service.

In technological studies the Fish and Wildlife Service has gone far in showing the industry how fish can be delivered virtually only "hours old" to the customer.

These studies are practically following the fish from the water to the table--on shipboard, in ship storage, in transit, in land storage, and right up to sales display.

The initial step in getting high-quality fish or fish products to the customer begins the minute the fish are taken out of the water, Fish and Wildlife Service technicians say.

Important questions which have been studied include freezing methods, ability of various species of fish to retain flavor and freshness during periods of refrigeration, the effect of breading upon freezing, the use of protective coverings to insure freshness in frozen fish, the development of "quality standards," and the search now in progress for the "flavor component," that intangible thing which makes fish taste like fish instead of something else.

Success in these programs, figuratively, brings the consumer--regardless of where he is--closer to the water's edge and make it possible to supply him with a product which meets the test of comparison with a fish just taken from its native waters.

One phase of the broad research program is to determine how the merchandising methods of the Nation's 413,000 retail fish products markets measure up to the consumer preference, and there are many facets of both merchandising and preference.

One approach which the Service has taken relates to packaging and portions. If the study of fish portions served in restaurants and other public eating places leads to packaging fresh or frozen fish on an acceptable portion basis, those of the 182,000 restaurants which have deferred serving fish because of handling difficulties might well become a steady market for portion-packaged fillets and other fish products.

To get the data on household consumers' food tastes and buying habits, housewives are being interviewed to determine the factors influencing the use or nonuse of the various species and kinds of canned fish and shellfish.

Studies are also being made of the size of package the housewife wants, her preference on species, and the availability of that species at the time she wants it.

Surveys on easy-to-prepare fish products such as breaded fish sticks or breaded shrimp have shown that the young housewife is more readily attracted to that type of a commodity; that the city dweller is a better customer than his rural cousin; that there is a relationship between the sales of these items and the salary brackets of the citizens, with low-salary families buying them lightly; and furthermore the surveys show that the majority of folks who use these products once become steady customers afterward.

But experience has shown that the customer insists upon uniformly good quality and that if the supply does not meet this particular preference sales are not made. To help the industry meet this quality demand by customers and to help the customers get the product they desire, the Fish and Wildlife Service, through technological studies, has been a leading force in the establishment of "quality standards."

The most recent step in that direction is the establishment of a program for the development of voluntary Federal standards for grades. Although the first standards, those for fish sticks, have been available for use only since August 21, 1956, several fish products companies have adopted these voluntary Federal standards in reply to the consumers' refusal to purchase products below satisfactory quality levels.

Next in the order of expected issuance will be standards for fish blocks (the raw material from which fish sticks are made), for such portion-control-type products as breaded fish squares and breaded shrimp; and frozen fillets of cod, haddock, and ocean perch. These standards will serve as yardsticks for the evaluation of quality for those products offered to the consumer.

In other words the Fish and Wildlife Service is studying or has studied most of the important steps between the fishermen's net and the consumer's table. It is blazing out a trail, so to speak, by setting up techniques whereby the industry can deliver to the consumer the freshest and most flavorful fish product. It is helping the consumer get the product he wants by finding out what he wants and passing that information along to the industry. Finally, it is determining guidelines of quality through which the industry and the consumer share a common confidence.

"Fish Parade" Promotion by Industry Backed by Interior Department

The "Fish Parade," which is the fishing industry's designation of its 1956 National Fish Week, October 29 to November 2, had the support of the U. S. Department of the Interior. Among the many features of the "Fish Parade" program was the "Shrimp Fiesta" which began October 15 and ended November 3.

The goal of the fishing industry was to develop an increased fall selling season when inventories are normally at their peak. Historically, the big selling season for fishery products occurs during Lent each year.

Because fish is one of the most valuable of protein foods, the All-Industry Fish Week Committee decided that a fall drive to increase the use of fish and shellfish would be beneficial to the industry and the consumer alike.

The 1956 drive for a big fall selling season was described by industry spokesmen as the most ambitious coordinated sales effort ever attempted by the fishing industry in this country. Not only were practically all segments of the American fisheries engaged in the drive, but wholesalers, distributors, and retailers throughout the Nation joined in the effort to make the fall sales campaign the most successful in history. Many State and local officials also join in the drive.

In pledging the support of the Department of the Interior to the industry's sales effort, Fish and Wildlife Service Director John Farley said:

"The fishing industry is important to the national health, safety, and interest. It renders valuable service to the people of this country by providing a large proportion of the Nation's food supply, as well as large quantities of meal for the feeding of livestock and of fish oils and fish liver oils for food, medical, and industrial uses.

"During 1955, 4.6 billion pounds of fish were produced in the United States and Alaska. Of this approximately 56 percent was used as food and 44 percent was used in the manufacture of byproducts or as bait. From these data it can be seen that fishery products are an important source of the Nation's supply of animal protein.

"The Department of the Interior, through the Fish and Wildlife Service, has a direct responsibility to the fishing industry and to the people of this country. Therefore, not only do I gladly pledge support to this magnificent effort but I also say very proudly that the Department of the Interior does not confine its efforts to one week in the year but that it works diligently in this field, through research, education, market promotion, and otherwise every week in the year. And I do not hesitate to add that we will endeavor to do even more for the fishing industry and the consumers in the future than we have done in the past."

Florida

AIRBOAT GILL-NETTING: Airboat gill-netting in Lake Okeechobee is a new twist in an old fishery. An enterprising mullet fisherman at Okeechobee reasoned that rowing around a school of mullet was too slow and difficult and decided to speed up the operation.

To expedite the plan, a three-foot extension was built on the stern of an airboat hull to house a 220-yard gill net (see fig. 1). The airboat, powered by a 100-horsepower Lycoming aircraft engine, is capable of speeds in excess of 40 miles an hour. The aluminum hull is 15 feet long with a 5-foot beam. The steering mechanism consists of a pair of air rudders behind the propeller and is operated by the driver with a connecting steering stick. The driver steers the boat while sitting in an elevated bucket seat. This is particularly advantageous since schools of fish are more easily seen from this height.

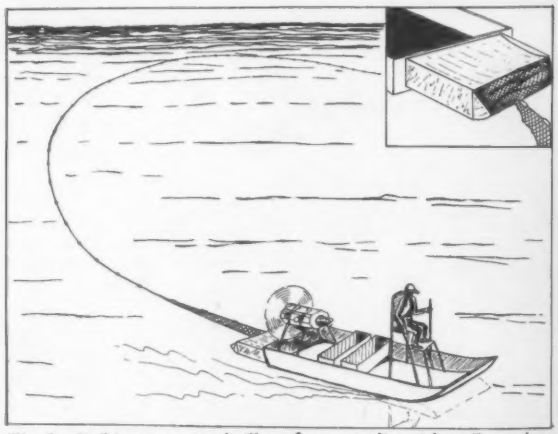


Fig. 1 - Striking run-around gill net from speeding airboat (Inset shows airboat extension with net being set.)

The net is customarily set at full speed. When a school of fish is located, the captain maneuvers into a desired position and a two-pound net anchor is cast overboard. The net anchor is attached to the lead and cork lines of the gill net. The drag of the anchor pulls the net from the compartment as the boat circles the school. After the boat completes the circle, the fishermen retrieve the net, stowing it in the compartment. In retrieving the net the enclosure becomes smaller, forcing the fish to strike the wall of mesh, thus becoming entangled. The fish are removed by hand and placed in boxes aft of the driver's seat. This operation takes from 30 minutes to one hour, depending on the amount of fish caught.

The net is a typical mullet runaround gill net, 200 yards long, 24 meshes deep, $4\frac{1}{4}$-inch stretched mesh, and No. 6 nylon twine. The nylon material takes a minimum of storage space and requires little maintenance.

Fig. 2 - Airboat with gill net adaption mounted on trailer for transporting to various fishing grounds.

Fig. 3 - Airboat used in run-around gill-net operation showing extension on stern for net storage.

Other applications of this unique fishing method have not been explored.

--Billy F. Greer & Donald T. Montgomery,
Fishery Marketing Specialists, Statistical
Section, Branch of Commercial Fisheries,
U. S. Fish and Wildlife Service,
Coral Gables, Fla.

Fur-Seal Skins

PRICES CLIMB AT GOVERNMENT FALL AUCTION: An increase of 6.3 percent in prices of United States fur-seal skins marked the semiannual auction of Government-owned furs at St. Louis on October 5, the Secretary of the Interior announced October 14, 1956.

Fur buyers examining fur seal skins prior to auction.

A total of 26,890 skins, products of the sealing industry administered by the Department of the Interior's Fish and Wildlife Service on the Pribilof Islands, brought $2,714,852. This compares with 27,017 skins sold for $2,519,994 at the April 17 sale. The grand average for all skins sold for the account of the United States Government was $100.96; at the April sale it was $93.27. The grand average at the October 1955 sale was $94.14.

The sale was well attended by United States, Canadian, and European buyers who commented favorably on the quality of the skins offered. Bidding was spirited because few skins are in the hands of dealers at the present time.

Of the Alaska skins, 17,555 were dyed "Matara" (brown), 419 were "Safari" brown (a lighter brown), and 8,916 were blacks. The Matara skins brought an average of $97.26, an increase of 5.5 percent over the April auction. The Safari skins sold for an average of $76.81, an increase of 18.3 percent. The black skins averaged $109.38, an upward change of 7.25 percent over the April price of $103.18.

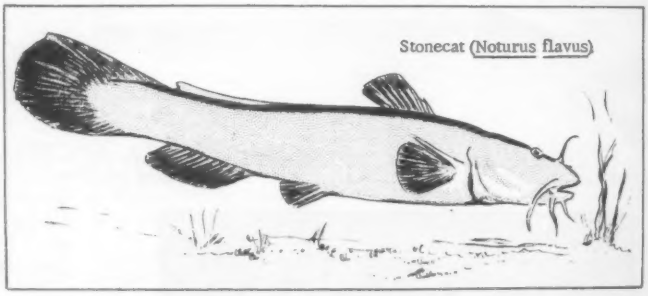
In addition to the United States skins, 3,699 Cape of Good Hope fur-seal skins were sold for the account of the Government of the Union of South Africa at an average of $34.33, an increase of 20.1 percent from the last sale. A total of 414 Uruguay fur-seal skins were sold for the Government of Uruguay at an average of $48.78, a slight increase over the April price of $45.12.

Prior to the auction an announcement was made that the Pribilof Island fur seal take for 1956 would amount to approximately 122,000 skins.

The next auction is scheduled tentatively for April 5, 1957, at which time the normal quota of United States skins to be offered for sale will be increased by about 3,000.

Great Lakes Fishery Investigations

M/V "CISCO" TRIES TO LOCATE SUMMER GROUNDS OF WALLEYE IN LAKE HURON (Cruise 5): An attempt to locate summer grounds of the walleye (Stizostedeon vitreum vitreum) outside of Saginaw Bay proper was the principal mission of Cruise 5 (August 21-September 2, 1956) of the M/V Cisco, the research vessel of the Service's Great Lakes Fishery Investigations. This cruise, like Cruise 3, was confined to Saginaw Bay and immediately adjacent waters in Lake Huron.


Stonecat (Noturus flavus)

Nylon gill nets (mesh sizes $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3, and 4 inches) were set off Harbor Beach and Grindstone City in 7 to 10 fathoms of water. It is believed that some of the walleye present in the lower end of the Bay during spawning season spread into Lake Huron proper at other seasons. Eight walleye were taken off Harbor Beach and 2 off Grindstone City. Several white suckers (Catostomus commersoni), longnose suckers (Catostomus catostomus), and yellow perch (Perca flavescens) were were caught in both nets. In addition, the nets off Grindstone City took 10 stonecat (Noturus flavus).

Nets of $2\frac{1}{2}$-inch mesh were set obliquely from surface to bottom in 26 fathoms and 13 fathoms off East Tawas. A set of $3\frac{1}{2}$-inch mesh gill net was also made at 13 fathoms. The $3\frac{1}{2}$-inch net took 20 white suckers, all but one at or just above the bottom. Sixteen white suckers, 2 longnose suckers, and 4 yellow perch were caught in the shallow $2\frac{1}{2}$-inch set, practically all near the bottom. A lone perch at midlevel represented the total catch in the deep set.

A bull net (300 feet long, 120 meshes deep, $2\frac{1}{2}$-inch mesh) was set over a 34-fathom bottom with the float line just at the bottom of the thermocline (60 feet). Two lake herring (Leucichthys artedi), 6 longjaws (Leucichthys alpenae), and 2 smelt (Osmerus mordax) were caught in this net.

Much difficulty was encountered in trawling operations this cruise. Trawls were repeatedly damaged and two of them were badly torn. In addition, on several occasions the nets became heavily loaded with mud. In the few successful hauls completed, only small numbers of perch, smelt, and forage fish were taken.

Seine collections were made in two locations along the northwest shore and two areas along the southeast shore of Saginaw Bay. It was hoped that walleye fingerlings could be located, but none were found. However, fingerlings of perch, largemouth black bass (Micropterus salmoides), smallmouth black bass (Micropterus dolomieu), black crappies (Pomoxis nigro-maculatus), and bluegill (Lepomis macrochirus) were taken.

Hydrographic transects were run from Bay City to East Tawas, East Tawas to Harbor Beach, East Tawas to Oak Point, and Hat Point to Au Sable Point. Surface water temperatures were nearly constant over the area covered, ranging mostly from 18 to 20° C. (64.4-68° F.). A low of 16.8° C. (62.2° F.) was recorded in Lake Huron, and a high of 23.2° C. (73.8° F.) was recorded near the mouth of the Saginaw River in Saginaw Bay. The epilimnion is thick in deeper water, ranging from 60 to 90 feet between upper and lower limits.

An all-night study of the vertical migration of Mysis relicta was made in 55 fathoms in mid-southern Lake Huron. A photometer was used to study light conditions from the time the organisms migrated up in the evening until they moved down in the morning.

* * * * *

LAKE HURON INVESTIGATIONS CONTINUED BY M/V "CISCO" (Cruise 6): Saginaw Bay and part of southern Lake Huron was the area where the Service's research vessel Cisco operated during Cruise 6 (September 11-24, 1956).

The usual oblique sets of gill nets were made off East Tawas in 13 and 26 fathoms, but the deeper set was of no value since the gang was dragged 5 miles by strong currents before it was recovered. A single bloater (Leucichthys hoyi) represented the total catch in the shallow gang, which was lifted before the current had moved it.

Two bull nets (each 300 feet long and 120 meshes deep) were set in 33 fathoms off East Tawas, one on the bottom and the other with its float line in the thermocline and its lead line just below the thermocline. The bottom net contained 117 bloaters, 125 Leucichthys alpenae, 4 L. reighardi, and 57 smelt. The midwater set caught 2 bloaters, 36 L. alpenae, 1 L. reighardi, 5 smelt, and 2 alewives. Thus it appears that L. alpenae move up to midlevels more than do L. hoyi.

Since several days were lost to weather, trawling was done only in one area. Drags in 6 to 8 fathoms off East Tawas produced mostly perch (Perca flavescens) and small alewives (Pomolobus pseudoharengus).

Nylon gill nets containing 300 feet each of 2-, 2¼-, 2½-, 2¾-, 3-, and 4-inch mesh were set in 25 fathoms off Harbor Beach and in 50 fathoms in midlake between Harbor Beach and Goderich. The shallow set took 135 bloaters, 22 L. reighardi, and a few each of L. alpenae, L. artedi, and smelt; the 50-fathom set 65 L. alpenae, 65 L. kiyi, 46 L. hoyi, 16 L. reighardi, and several L. zenithicus and L. artedi.

Hydrographic transects were run from Bay City to East Tawas, East Tawas to Harbor Beach, Harbor Beach to Goderich, East Tawas to Oak Point, and Hat Point to Au Sable Point. Surface-water temperatures dropped rapidly under the influence of cold winds toward the end of the cruise. The highest temperature recorded was 19.2° C. (66.6° F.) and the lowest 11.4° C. (52.5° F.).

Market for Frozen Foods Increases 50 Percent in Year

Prepared frozen foods now constitute more than a third of all frozen foods marketed in the United States, after a remarkable increase of nearly 50 percent in 1955. Manufacturers of these convenience foods looked for a further substantial increase in 1956--perhaps 35 percent over the 1955 total.

Agricultural products have gained most in this relatively new field of merchandising, but the fishing industry has also chalked up an impressive record. Fish sticks sprang into national prominence in 1954 in the path of breaded shrimp. Other prepared fish specialty items soon appeared in grocers' display cases.

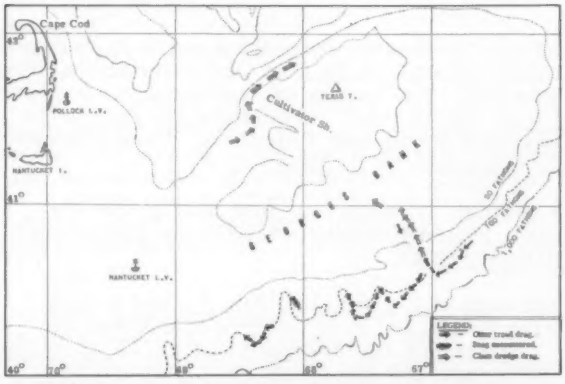
Housewives welcome the freedom from unpleasant odors and waste and the certainty of well-prepared meals with a minimum of effort. So they are buying more and more of the many attractively-prepared frozen foods.

What is behind all this revolutionary change in marketing? The answer is advertising and promotion. Tempting color spreads in magazines arrest the attention and make fishery products inviting to young and old. Users of television, radio, and newspaper advertising continually keep their products' merits before consumers.

Those who pack these new prepared frozen food specialties have assumed a heavy responsibility to the consuming public. Most packers show a keen sense of awareness to the need for adherance to highest quality levels to insure repeat business. Government-sponsored voluntary standards of quality for fish sticks which are now in effect promise to exert a strong stabilizing influence on sales of this product.

North Atlantic Fisheries Exploration and Gear Research

DEEP-WATER TRAWLING FOR OCEAN PERCH BY M/V DELAWARE (Cruise 26): Deep-water exploratory trawling for ocean perch along the edge of the continental shelf, south of Georges Bank, by the Service's exploratory fishing vessel Delaware revealed no commercial concentrations of trawl fish during this 11-day trip. Previous operations by the Delaware during deep-water lobster exploration in this same area gave indications of possible commercial concentrations of ocean perch (Sebastes marinus). This cruise was undertaken in order to more thoroughly map the bottom and commercial fishing potential of this deep-water area during the early fall months.



M/V Delaware (Cruise 26) September 25-October 6, 1956.

A total of 22 otter-trawl tows and 14 dredge stations were made despite rough weather resulting from the aftermath of hurricane Flossy. No significant catches of commercial species were made. Operations were conducted with a trawl net on the southern edge of Georges Bank from 100 to 350 fathoms of water. One net and a set of ground cables were lost after hanging up on an unknown bottom obstruction.

A total of 14 dredge stations produced indications of ocean quahogs (Artica islandica) and sea scallops (Pecten grandis). This minor phase of the operation was conducted as a preliminary exploratory operation incidental to the major objective of the cruise. About 1,500 pounds of lobsters were caught incidental to the fish-trawling operation. About 150 pounds were landed at the Service's East Boston Fishery Technological Laboratory for freezing tests.

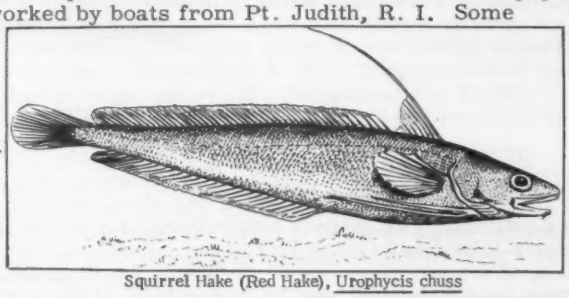
Systematic offshore tuna reconnaissance will be conducted by the Delaware during Cruise 27. The vessel was scheduled to depart from East Boston on October 16, 1956. Additional information on the fall migrations of bluefin school tuna found during the summer in the New England area was the primary objective of the three-week cruise. Plans called for exploration in the oceanic area south of Georges to the center of the Gulf Stream.

The Delaware was to make observations both visually and electronically with "fish finder" equipment for detection of subsurface schools. Trolling gear was to be used if any surface pelagic fish schools were sighted.

This is the first in a series of exploratory fishing surveys to the northwest central area of the North Atlantic and the operation is a continuation of the Service's program to evaluate both the inshore and possible offshore potential of New England's tuna resources.

North Atlantic Fisheries Investigations

TWO-YEAR-OLDS PREDOMINATE IN RED HAKE POPULATION (M/V T-79, Cruise 6): Two-year-olds are now the predominant members of the red hake population in the local fishing areas worked by boats from Pt. Judith, R. I. Some three-year-old fish were taken in 40 fathoms, very few were seen elsewhere. This shift from three-year-old-fish which were the predominant members of the catch at the beginning of the summer indicates a very high mortality rate at this age, especially in view of the fact that there is no evidence at this time that the older fish abandon the grounds and move out in any numbers. These were the findings of Cruise 6 (September 12-15, 1956) of the Service's research vessel T-79.



Squirrel Hake (Red Hake), Urophycis chuss

Red hake has a marked periodicity in feeding rhythm during the day. They were found to have consistantly full stomachs in midmorning, with little evidence of any digestive action. In early afternoon, the stomachs were still full but the contents showed considerable evidence of digestive action. By late afternoon, the stomachs had been almost entirely emptied and the intestines were full of macerated material.

The food in red hake stomachs will be analyzed for species present and the data compared with the material collected by the bottom plankton sampler and the bottom grab.

Surface water temperatures were in the lower sixties (F.) at all stations. Bottom temperatures were in the lower forties (F.) A fairly well developed thermocline was present at all stations.

The purpose of the cruise was: (1) to sample species composition of fishes on various grounds; (2) to determine diurnal periodicity of feeding habits of the commoner species of fish; (3) to determine the abundance of and the species of the various common bottom organisms; and (4) to tag skates and some other species of fish if they are sufficiently abundant on the grounds fished.

Five fishing stations and eight hydrographic stations were occupied. The fishing stations were local fishing areas for boats from Pt. Judith with the exception of the last, a relatively deep-water station. A series of BT casts was made from Block Island Sound out to 150 fathoms.

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UNDERWATER TELEVISION EQUIPMENT TESTED UNDER TOW BY VESSEL "T-79" (Cruise 7 and 9): The Service's research vessel T-79 on the afternoon of October 5, 1956 (Cruise 7) tested underwater television equipment under tow in Falmouth Harbor. The television camera with attached stabilizing fins and 43-pound depressor was towed at speeds up to $2\frac{1}{2}$ knots. The equipment performed well under tow. A 35° to 40° cable angle was obtained at approximately $2\frac{1}{2}$ knots.

Another cruise (No. 9) on the afternoon of October 16 was made to test underwater television equipment off Naushon Island. Operations consisted of bottom viewing and towing while under way. Bottom organisms were clearly observed at depths of 36 feet while the vessel was at anchor. Camera launching and handling techniques were improved during this cruise. The camera with appropriate stabilizing devices was towed at slow speeds. Plans are now being developed to view commercial trawling operations with techniques devised on this cruise.

North Atlantic Herring Research

HERRING EXPLORATION ALONG MAINE COAST AND BAY OF FUNDY BY M/V "METACOMET" (Cruise 6): Generally schools of herring brit were found to be present in appreciable quantities along most of the Coast of Maine from Portland to Eastport. The largest concentrations were in the Passamaquoddy Bay-Grand Manan Island and Casco Bay areas. Small sample lots were taken, where practicable, of 0 year-class "brit" or larger herring that could become available as sardines during the fall months by the M/V Metacomet, a Fish and Wildlife Service chartered exploratory fishing vessel. During Cruise 6 (August 18-30, 1956), the vessel was scouting most of the major bays, sounds, and rivers along the Coast of Maine from Casco Bay to Eastport and the Canadian waters of the Bay of Fundy around Grand Manan Island, the Wolves Islands, the northwestern shore of Nova Scotia from Digby Gut to Petite Passage, and St. Marys Bay.

The samples were obtained by making short tows with a British Columbia-type midwater trawl with a small mesh liner in the cod end. The tows were made to determine the species of fish located by the depth-sounder, the size of herring if present, and the percentage of herring infected by various disease and parasitic organisms characteristic of the species. The latter determination is being carried on at the Boothbay Harbor biological laboratory.

In the general area of Passamaquoddy Bay good showings of herring were recorded by the depth-sounder and sampled in the St. Croix River, St. Andrews Bay, Western Passage, Friar Roads, the eastern shore of Deer Island, Grand Manan Channel, and between East Quoddy Head and The Wolves. Very few fish were

located by the depth-sounder in Cobscook Bay or South Bay. There was only one fair-size school of fish noted on the depth-sounder between the Wolves and Digby, Nova Scotia. Scattered surface schools were recorded off Digby and from Digby southwest along the shore of Digby Neck to Petite Passage. No fish were recorded in Lower St. Marys Bay or between Briar Island and Grand Manan Island.

A few scattered schools were located by the depth sounder near Cutler Bay and in Machias, Englishmans, Chandlers, Western, Pleasant, and Narraguagus Bays. Fair showings were recorded on the sounder in Frenchmans Bay, where several samples were taken.

Only a few very scattered small schools were found in Penobscot Bay and Blue Hill Bay, except for one good school of brit recorded and sampled in the Union River. Very few fish were recorded in the Muscongus Bay area or Johns Bay. Good showings of fish were recorded in the Damariscotta River near East Boothbay and Plummers Point, and scattered fish were observed between this river and the Sheepscot. Samples were taken near Ebenecock Bay and Barters Island in the Sheepscot River. Scattered schools were recorded off Seguin Island, Cape Small, and in the outer waters of Casco Bay.

In the Casco Bay area very good concentrations of herring were recorded and sampled near the mouth of the New Meadows River and in Hussey Sound. Other large schools, quite apparently herring brit, were recorded in Portland Channel, Broad Bay, and Middle Bay.

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MIDWATER TRAWL GEAR TESTED BY M/V "METACOMET" IN GULF OF MAINE (Cruise 7): In order to gain more information on the possibility of catching herring and herringlike fish in commercial quantities in Gulf of Maine waters, the M/V Metacomet, a Fish and Wildlife Service chartered exploratory fishing vessel, tested midwater trawl gear during Cruise 7 (September 5-15). The trawl used was the first type designed by W. A. Barraclough and W. W. Johnson at the Pacific Biological Station at Nanaimo, British Columbia, Canada, and used successfully to catch herring in British Columbia waters during winter months.

Fish were sounded and tows made at the Isles of Shoals, Boone Island, Ipswich Bay, and on the north, east, and south sides of Cape Cod. Tows were made through large solid schools of fish on several occasions, the largest of these being schools of bluebacks (Pomolobus aestivalis)--a species closely related to the herring--in Ipswich Bay. All tows were made during the night.

The largest catches were of 2 to 3 bushels of bluebacks approximately $8\frac{1}{4}$ inches, standard length. It was noted as the net was being hauled aboard that a large portion of these small catches were in the body of the net rather than in the cod end. This indicates that these fish were probably swimming along inside the net.

Since the net was towed directly through waters where large solid schools were located with the depth sounder without catching any appreciable quantities, it appears that the fish can detect the approaching net by sight, sound, or water pressure and are able to avoid it. Once the fish become frightened by the net they are likely able to swim as fast or faster than the net (towing speed spproximately 3 knots) and escape capture.

Water temperatures are relatively high during this season and the fish are near their peak of activity. It is significant that the best successes with this type of net have been obtained during cold winter months when the fish are relatively inactive. Another midwater trawl test is being planned for the winter season.

Cruise 8 of the Metacomet was scheduled to begin September 24 and end October 12. Two types of gear were to be tried out: (1) a 125-fathom half-ring lampara seine for fishing sardine-size herring; and (2) a small-size midwater trawl. The seine was to be tried out as a method of catching sardines in open waters. The smaller midwater trawl was to be tried in order to attain a higher towing speed and to allow taking samples in shallower water than is possible with the larger trawl.

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LAMPARA SEINE, MIDWATER TRAWL, AND DEPTH INDICATOR TESTED BY M/V "METACOMET" (Cruise 8): Tests of three items of fishing gear and apparatus were conducted by the Service's chartered exploratory fishing vessel Metacomet during Cruise 8: (1) a modified lampara seine, (2) a small midwater trawl, and (3) an air-pressure depth indicator.

The lampara seine tried was patterned after a West Coast tuna bait seine with modifications to allow easier setting and partial pursing while hauling. The midwater trawl tested was patterned after the original Barraclough and Johnson trawl as described in Bulletin No. 104 of the Fisheries Research Board of Canada except that all measurements were cut in half and $\frac{3}{4}$" mesh was used in the last two sections of the cod end. The depth indicator was used to ascertain the depth of the bottom of this net as it was being towed beneath the water surface. Testing was carried out in inshore waters between Portland and East Penobscot Bay from September 26 to October 12, 1956.

Several sets with the lampara seine were completely unsuccessful.

In using the small midwater trawl, it was hoped that the higher attainable towing speeds would result in larger catches. Short trial tows with the small midwater trawl were made in Casco Bay and Penobscot Bay on echo-sounder recordings of fish. Catches were made of up to 215 pounds of herring, averaging approximately $2\frac{3}{4}$ to 4 inches. Indications to date are that midwater trawls will be useful during the seasons of higher water temperatures only as a tool for sampling schools of small herring. The large catches reported taken with this gear in other areas have been made during winter months.

The depth indicator was tested by lowering it vertically into the water to measured depths and by using it attached to the footlines of the midwater trawl when towing over fish located by the echo-sounder. The pressure indicated depths corresponded with the measured depths in the vertical test and fish were taken in the midwater trawl when the indicator showed the net to be moving through a stratum occupied by fish as shown by echo-sounder recordings. Both types of tests substantiate the accuracy of the depth readings indicated.

Cruise 9 of the Metacomet was to be devoted to purse-seining operations. The vessel has been equipped with purse-seining gear and a $1\frac{1}{2}$-inch mesh purse seine for this cruise. The objectives of the cruise are: (1) to learn if a purse seine can be set and successfully handled in open waters with a New England dragger-type vessel and (2) to attempt to catch sardine-size herring with this type of gear. The cruise was scheduled to start October 19 and end on or about October 27.

North Pacific Exploratory Fishery Program

BOTTOM FISH SURVEY IN WATERS OFF SOUTHEASTERN ALASKA BY M/V "JOHN N. COBB" (Cruise 29): A search for bottom fish in waters off Southeastern Alaska is the purpose of Cruise 29 of the Service's exploratory fishing vessel John N. Cobb. The vessel was scheduled to leave Seattle on October 1 and return on November 16.

The bottom-trawling exploration was to be concentrated on the continental shelf and slope from Dixon Entrance northward to the southern end of Baranof Island. Commercial-size otter trawls were to be used, and extensive echo-sounding was to be carried out to determine the extent of suitable bottom. It was planned that trawling was to be conducted out to depths of 200 fathoms or more to determine species and quantities of marketable trawl fish present in these waters at this time of year.

Mending otter-trawl net aboard the Service's exploratory vessel John N. Cobb. Exploring new grounds means frequent tear-ups.

Commercial fishermen have requested exploration of these grounds because it has become necessary for them to go farther from port in recent years in order to bring in good catches. It is thought that species such as Pacific Ocean perch, cod, and "sole" may be present off Southeastern Alaska in quantities sufficient to support profitable fishing. Navigation charts indicate that a considerable part of the bottom is rocky, but certain places with sand or mud bottom appear to be satisfactory for trawling.

The vessel was also to carry shrimp beam trawls, and a limited amount of exploration for shrimp in promising inshore areas was planned, primarily during periods of bad weather when offshore trawling would not be practical.

Oregon

EXPERIMENTAL FISHING FOR DOVER SOLE: Experimental fishing to find the most economical methods of catching young Dover sole in offshore waters is being conducted by two biologists of the Oregon Fish Commission.

The biologists, stationed at the Commission's Astoria research laboratory, have been testing the effectiveness of a "try net" for possible use in an extensive study of the early growth of Dover sole scheduled to begin next summer. The biologists want to determine if the net can be used practically from a vessel smaller than the normal otter trawler. Through cooperation of the state police, the biologists have been doing their experimental fishing aboard an offshore patrol boat regularly used in law-enforcement work.

The "try net" is a miniature replica of otter-trawl nets used commercially in Oregon waters. It was developed originally by Gulf Coast shrimp fishermen for use in locating commercial concentrations of shrimp. A try net was used successfully by the Commission during a 1951 study of the early growth of English sole in Yaquina Bay, but was not tested in deeper water off the coast.

If the try net will efficiently catch the young flatfish, it will probably be used to obtain monthly samples of Dover sole during the growth study. Fish caught will be measured and examined to determine sex, if possible. "Ear bones" or otoliths and scale samples will be taken from some of the fish captured and will be examined microscopically to find out when the first growth ring is laid down. Such information is necessary for proper management of the Dover sole fishery, the biologists explained.

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FINGERLING FISH PASSAGE AT DAMS TO BE INVESTIGATED: Methods of collecting downstream migrant salmon and steelhead fingerlings from reservoirs at high dams having little or no spill and fluctuating water levels will be investigated by the Fish Commission of Oregon under a $73,000 contract with the U. S. Army Corps of Engineers.

The study will be initiated at Lookout Point reservoir near Oakridge sometime next spring. In the meantime, for the experiment the Corps of Engineers is constructing a "fingerling collector" consisting of a large pump mounted on a floating platform. Capable of discharging up to 50 cubic feet of water per second, the pump will be used to create water currents with the hope of attracting small fish to a trap installed on the float.

It is a common assumption among fisheries workers that migrant fingerlings can detect and follow water currents in lakes. In nature young sockeye salmon, which spend a part of their lives in lakes, must find obscure outlet streams that will carry the young fish to the ocean. Previous research has shown that the majority of young migrants are concentrated at or near the surface in reservoirs, particularly if there is a surface outlet. The big question is whether or not sufficient numbers of young fish can be attracted by aritificially-created currents.

At the time Lookout Point and Detroit dams were constructed fish passage facilities were omitted because no practical method of getting young fish out of the reservoirs was at hand. Perfection of a fingerling collection system might make it possible to bring these large reservoirs into production of salmon and steelhead.

When field tests of the fingerling collector are started next spring, approximately 100,000 blueback (sockeye) salmon fingerlings will be released in Lookout Point reservoir. The bluebacks were obtained as eggs from the U. S. Fish and Wildlife Service hatchery at Leavenworth, Wash., but are being raised at the Fish Commission's Oakridge salmon hatchery.

The fingerling collector will be operated at various locations within a 500-foot radius of the north shore of the reservoir to determine where fingerlings can be collected most efficiently. Test gill nets will be set to assist in locating concentrations of fish near the face of the dam.

The Lookout Point fingerling passage study is part of an extensive research program financed by the Corps of Engineers to investigate hydroelectric development problems affecting fish. Under the same program, the Oregon Fish Commission is currently studying possible delays in upstream fish migration at Columbia River main stem dams and is conducting research on the size and migrational habits of salmon and steelhead runs in the Snake River system.

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NORTHWEST ALBACORE TUNA CATCHES SAMPLED: With the return of commercial quantities of albacore tuna to the Oregon coast this year, the Oregon Fish Commission albacore biologist sampled albacore catches daily and interviewed boat

skippers to obtain all available information on the elusive "chicken of the sea." The last good catch of albacore in Oregon waters was in 1950. During the "lean" years, the Oregon biologist had to rely upon samples of California catches of albacore landed at Astoria by local boats late in the season.

About 1,500 tuna were to be sampled this past fall to determine the size make-up of local catches. The biologist also took scale samples and cut the tails of the first 20 fish in each sample to obtain the 33rd vertebra used in aging albacore.

"Cutting the tails off the fish is the easiest part of aging the fish," claims the biologist. The tails are boiled to obtain the vertebra for close examination. Growth rings on the vertebra reveal the age of the fish.

The size of albacore taken off Oregon this year steadily decreased. The average weight was 17 pounds when fishing started but dropped to 12 pounds. This was common in former years of albacore fishing off Oregon, according to the biologist. The largest albacore seen by the biologist was a 45-pounder. Even 30-pound fish are scarce in Oregon catches.

The Oregon Fish Commission biologist participated in a seven-week research cruise this summer that definitely established the fact that albacore were present in Oregon waters this year. The Oregon biologist stated that albacore could have been off Oregon last summer, but none were caught or sighted last season.

Pacific Oceanic Fisheries Investigations

EXPLORATORY TUNA FISHING AROUND MARQUESAS ISLANDS BY M/V "CHARLES H. GILBERT" (Cruise 30): A 51-day exploratory tuna fishing cruise to the Marquesas Islands was completed by the Service's research vessel Charles H. Gilbert when she returned to Honolulu on September 26, 1956. The principal purpose of the cruise was to explore the tuna fishing potential of the waters around the French colony which, except for Easter Island, is the outpost of Polynesia closest to the present fishing grounds of the California tuna fleet and therefore of considerable interest to the Mainland tuna industry.

A total of 20 days were spent long-line fishing, 16 days on the open seas east of the group, and 4 days in inshore waters. Catches were generally low. The best daily catches of each species were 20 yellowfin, 14 albacore, and 7 bigeyed tuna. Some of the big-eyed taken were unusually large, the heaviest one weighing 370 pounds. The best albacore catches were made at the most southerly locations fished around the islands.

The vessel also spent 12 days in scouting for schools of tuna at the surface, intending to fish them with pole-and-line using Marquesan sardines as live bait, the fishing method that California fishermen would employ were they to move into this area. Few schools were found, however, in this Southern Hemisphere winter season, and those that were sighted were composed of small skipjack, weighing about 5 pounds, and "wild" and unresponsive to the attempts made to fish them. Only one yellowfin tuna was taken at the surface, on a trolling line. Four 40- to 60-pounds dogtoothed tuna, a species not found in Hawaiian waters, were caught while trolling over banks.

Fishing was conducted by the vessel around all of the 11 islands of the Marquesas group, and the party landed at Taihohae, the French administrative center, and at Taipi Valley. The bait resources at these two places were surveyed and samples of the sardines were taken for experimental fishing in Marquesan waters

and for introduction into the Hawaiian area. The vessel brought back to Oahu 21 buckets, or about 2,500 fish, alive and released them in Hanauma Bay. If this introduction is successful and the Marquesan sardines manage to adapt themselves to Hawaiian conditions and increase, they may help ease the critical shortage of live bait in the Hawaiian skipjack (aku) fishery.

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GOOD ALBACORE FISHING FOUND NORTH OF HAWAII BY M/V "JOHN R. MANNING" (Cruise 32): Prospects for development of a fishery for the valuable albacore tuna in central Pacific waters north of the Hawaiian Islands have been considerably brightened by the excellent catches made on the most recent exploratory fishing cruise in that area by the U. S. Fish and Wildlife Service research ship John R. Manning. The vessel returned to Honolulu September 12, 1956, from a trip of nearly 2 months which took the vessel all the way to the Aleutian Islands where she delivered to a local cannery 4 tons of albacore captured by gill-netting and trolling. Although Hawaii has at present a well-developed local fishery for skipjack, which is canned as "light-meat" tuna, and a smaller long-line fishery which delivers yellowfin and big-eyed to the fresh fish market, the higher-priced albacore is not now landed in the Islands in significant quantities. Development of a Hawaii-based fishery for this species would make an important contribution to the fishing industry of the Territory.

The vessel's explorations covered the area between the longitudes of 175° W. (roughly north of Midway Island) and 145° W. (northeast of the main Hawaiian Islands). The greatest abundance of albacore was found in the western part of this area, between 43° N. and 47° N. latitudes, with a marked falling off in the catches east of 160° W. Surface trolling with six lines was done during the day, and sets of gill nets and trammel nets of various mesh sizes were made during the night. Gill-netting was much more productive than trolling, with approximately 500 albacore taken in the nets as compared with 100 on the trolling lines. Net catches ran as high as 89 fish a day, although only 8 of the 12 nets used had meshes of a size suitable for the albacore encountered on this cruise.

Exploratory fishing was supplemented with studies of the albacore's environment through collection of plankton, measurement of water temperatures and transparency, and observation of sea birds and marine life. Considerable numbers of large squid and of such small pelagic fishes as pomfret and saury were seen and specimens were collected. Experiments in night trolling with luminous lures and in live-bait fishing using sand launces collected in the Aleutians were attempted but without success. Eighty-six albacore were marked with plastic tags and released alive in order to study their migrations and growth rate. Earlier recaptures of such tagged fish have indicated a possibility that the stocks of albacore which support large commercial fisheries off the North American and Japanese coasts may migrate across the Pacific north of Hawaii.

Interesting sidelights of the voyage include the capture in the gill net of five salmon and one fur seal, which were turned over for study to Fish and Wildlife Service representatives in the Aleutians.

The Service's John R. Manning has been operating to the north of Hawaii, surveying the abundance of albacore tuna between longitude 175° W. and 145° W. Her survey is being coordinated through the Albacore Steering Committee with similar surveys between 145° W. longitude and the Pacific coast by the U. S. Fish and Wildlife Service exploratory fishing vessel John N. Cobb, and the Brown Bear of the University of Washington, the latter cooperating with the Oregon Fish Commission.

The results reported by the John R. Manning fit well with those obtained by the John N. Cobb which caught no albacore along 145° W. The results are also completely compatible with the picture developed during last summer's surveys. During 1955 albacore tuna appeared most abundant to the west, became very scarce or disappeared in the general vicinity of 145° W., and were located in fair numbers again off the coast of Oregon and northern California by the John R. Manning.

Fragmentary reports from the Pacific Coast indicate that some commercial operators followed the leads provided by the research vessels this summer and last summer and fished for albacore off Oregon with some success.

Transportation Rates

RAILWAY EXPRESS SEEKS INCREASE IN EASTERN TERRITORY: The Railway Express Agency in August 1956 filed another petition with the Interstate Commerce Commission seeking an increase of 15 percent on all less-carload charges on shipments within Eastern Territory. This territory covers the area abounded by Mackinaw City (Mich.), Chicago, St. Louis, Paducah, Cincinnati, Norfolk, and Eastport (Maine). The Agency states it is asking for surcharge on traffic in this area to eliminate huge passenger-train deficits, which include express traffic.

This action follows a recent announcement of several Eastern lines that first-class rail fares will be increased 45 percent and coach fares 5 percent in order to reduce passenger deficits.

Reclamation to Build Fish Screen to Save Young Fish on Delta-Mendota Canal, California

A unique "fish screen" will save millions of young salmon, striped bass, shad, and catfish from the turbulence of the world's second largest pumping plant--the Bureau of Reclamation's Tracy Pumping Plant on the Delta-Mendota Canal in central California. The Secretary of the Interior announced on October 27, 1956, details of a $988,116 contract for constructing the facilities.

Fig. 1 - Looking downstream on secondary louvers with traveling screen unit and pumping plant in background.

A commercial and sport fishery resource estimated to be worth $10,000,000 annually will be protected by the fish diversion and collecting facilities, said the Commissioner of Reclamation.

Existing temporary fish screens will be replaced by a louver-type diversion that "leads" the fish to safety. The novel design of the new facilities was developed after long and intensive study by Bureau of Reclamation engineers and Fish and Wildlife Service biologists, with the assistance of the California State Department of Fish and Game.

The fish protective device will consist of a row of vertical louvers extending approximately 340 feet diagonally across a concrete channel 83½ feet wide and 25 feet deep. The minute baby fish, averaging an inch long, are carried tail first

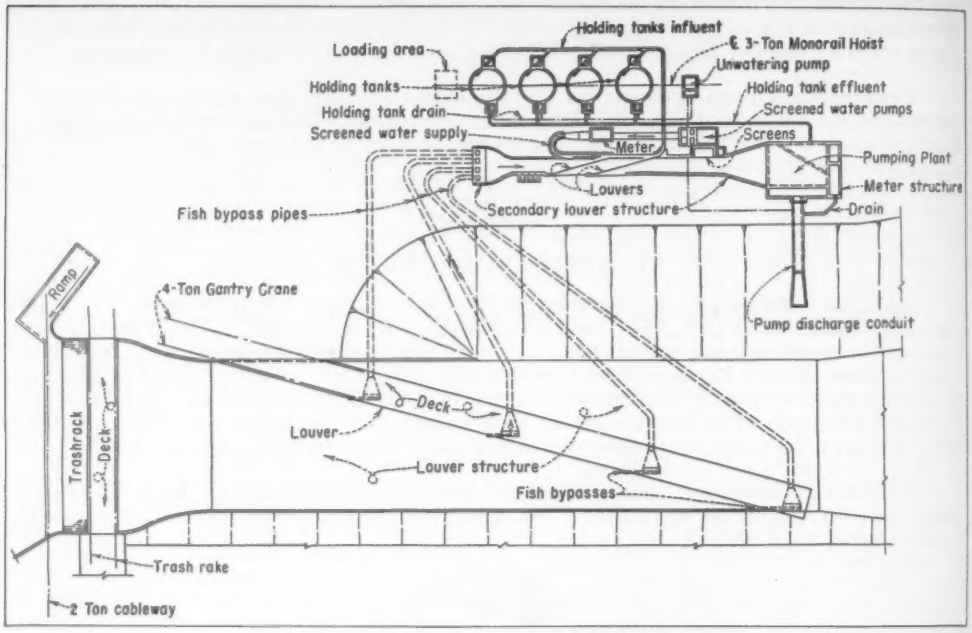


Fig. 2 - Sketch plan -- Tracy Fish Collecting Facility.

down the channel by the current, but as they approach the louvers they swing to one side to avoid the disturbing eddies and sounds made by the slats placed at an angle to the current. The fish keep moving over until they are siphoned into a bypass that carries them to a holding tank.

From holding tanks, the young fish are to be counted and trucked 40 to 50 miles to an area where they can swim safely to the sea.

The Tracy Pumping Plant, which draws water from the Delta area of the San Joaquin and Sacramento Rivers at the head of San Francisco Bay, lifts 4,600 cubic-feet-per-second of irrigation water 197 feet into the Delta-Mendota Canal which carries it 120 miles to supply Central Valley lands.

Fig. 3 - General view of construction of holding tanks, secondary louver, and pumping plant areas for the Tracy Pumping Plant on the Delta-Mendota Canal in Central California.

The Delta, with its maze of channels, is the most important spawning and rearing area for striped bass and shad on the Pacific Coast. Young king salmon are found in great numbers in the waters of the Delta where they loiter on their way to the ocean. Catfish are an important sport fish taken in large numbers and spend their life cycle in the Delta waters.

Salmon, striped bass, and shad are anadromous fish. That is, they spawn in fresh water but spend their adult lives in the ocean. The young fish descend the rivers to the sea, carried by and following the major flows of water. Thus, the major diversion of the Delta-Mendota canal operating at full capacity would be nearly as great an attraction to these young fish as would the combined river flows to the ocean. Fish experts believe the great pumps of the Tracy plant would kill a major portion of fish entering the canal, and the fishery resource--of considerable importance to California--would be seriously damaged.

Devices to protect fish are included wherever necessary on all features of the Central Valley project, which provides irrigation water for 634,000 acres and produces 2,226,370,000 kilowatt hours of power annually from its multipurpose dams. Planned release of cool water from major dams such as Shasta, Keswick, Nimbus, and Folsom, helps maintain conditions favorable to salmon.

Saltonstall-Kennedy Act Fisheries Projects

FISH AND WILDLIFE SERVICE REPORTS PROGRESS MADE: Progress which the U. S. Fish and Wildlife Service has made with Saltonstall Kennedy Act funds in the fields of research, exploration, technology, marketing, and education on behalf of the fishing industry and the consumer is detailed in a report to Congress just released by Secretary of the Interior Fred A. Seaton. The report describes the accomplishments in the fiscal year ending June 30, 1956, and outlines the projects which are being undertaken during the current fiscal year.

The additional funds made available as the result of the amendment to the Saltonstall-Kennedy law by the Fish and Wildlife Act of 1956 will be allocated in the near future in light of the advice of the American Fisheries Advisory Committee which met in Chicago on October 11 and 12.

The report divides the Saltonstall-Kennedy work into two categories--Fishery Biological Research for which $1,385,000 was allocated for fiscal year 1956 and $1,376,500 for fiscal year 1957; and Commercial Fishery Studies, with $1,426,000 allocated in fiscal year 1956 and $1,418,500 available for fiscal 1957. The balances were absorbed by administrative expenses.

Research on Alaska salmon, the Pacific sardine, the North Atlantic trawl fishes, herring, Gulf of Mexico fishes, striped bass, menhaden, and a phase of the ocean research program took $1,041,000 in the past fiscal year; $1,063,700 is allocated to the same group of projects for the current year. The money for oyster research in the Gulf, mid-Atlantic, and New England areas is the same for each year, $75,000, with each fishery getting $25,000. The big Pacific Oceanic studies which are based at Hawaii and which are to define the location of albacore tuna stocks in waters north of Hawaii had $234,000 in 1956 and have $227,000 in 1957.

The Commercial Fishery Studies include exploratory fishing and gear research, fishery technological studies, commercial fishery statistics, commercial fishery economic studies, and fishery education and market development.

The exploratory fishing and gear research work includes a Maine sardine program (coordinated with the biological work on the sardine and North Atlantic explorations for new fishing grounds) and South Atlantic exploration primarily for valuable offshore shrimp (which are being located in commercial quantities). The total allocated was $299,000 for fiscal 1956 and $304,000 for fiscal 1957.

The fishery technological studies include research on the handling of the southern oyster, development of voluntary standards for fishery products, development of a chemical index for the nutritive value of fish meal, creating of new uses for fish oil, improvement in the quality of skipjack tuna, and a Great Lakes survey. All of these programs will be carried on through fiscal 1957 except the Lakes ($15,000) survey which was completed in 1956. The amount allocated was $464,000 in 1956 and $5,000 less in 1957.

The commercial fishery statistical program has been allocated $200,000 for each year. The economic studies which dealt primarily with fish consumption and economic surveys of certain segments of the fishing industry used $148,000 in 1956 and have $138,000 for 1957.

Fishery education and market development include such projects as creating new markets for underutilized fish, test kitchen activities to develop recipes for cooking fish, increasing the sale of fish to frozen food lockers, exhibits at national conventions, promotion of the use of fish in school lunch programs, production and distribution of motion pictures relating to the fishing industry, special market studies, preparation of market aids, and the issuance of numerous publications. For this work $315,000 was spent in 1956 and $317,500 is allocated for the current fiscal year.

The Alaska salmon research is concentrated on problems for which answers are needed urgently in the management of the fisheries. The studies are being made in Bristol Bay, considered the most critical management area in the Alaska fishery. Methods of counting downstream migration to be used for the prediction of the runs, methods of counting adult escapement, and general problems concerning the migration routes are among the items being studied.

The Kvichak River system, the largest red salmon stream in Alaska, is the scene of a project which includes a survey of the spawning grounds, a determination of the age and size of the fish commercially taken, the age and size of those which escape, and counts of salmon heading for the sea for their long tenure in the open waters.

There are two predator studies being made--one relating to the extent of predation on salmon runs by fish, bird, or mammal predators and another study to determine whether or not the sea lions and hair seals of western Alaska prey upon salmon. There are studies on counting salmon in small streams, counting salmon by the use of towers which give the observer a place of vantage, and another study on counting the fingerling red salmon in Bristol Bay. Still another project deals with the effect of logging upon salmon streams.

In the Gulf of Mexico much of the work has been done on shrimp and on red tide investigations, but menhaden and sponges have also come in for research and study.

One important goal in the ocean research is to "reach a scientifically sound understanding of what the weather does to change conditions in the sea and what these changes in the sea will do to the numbers, distribution, and fishery yield of the ocean fish populations." Fish and wildlife biologists believe that when this understanding is reached with sufficient correctness to assure predictions, a new door will be opened to more efficient fishing and to make the various fisheries safe from overexploitation.

In the area of exploratory fishing and gear research, extensive information has been obtained on bottom trawling; offshore stocks of shellfish and pelagic fish were explored; the possibility of a shrimp industry off Nova Scotia was studied; midwater and otter trawls and lampara seines were tested; the possibilities of a new red

shrimp industry in the South Atlantic brought some optimistic results; and considerable laboratory work on gear development was accomplished.

One of the fields of technological research concerned the discovery of new uses for fish oils. One result of this work is the "breaking down" of certain chemical components of fish oil. This could open the way to the creation of many new products, just as did somewhat similar work on coal. Other technological projects included freezing studies, storage, new uses for fish meal, and scales.

The market and economic studies were designed primarily to learn where the fish distribution and utilization pattern was weak and to find out why. Among the projects were many consumer surveys which develop information to help the fish producer better meet the needs and desires of the customer.

* * * * *

AMERICAN FISHERIES ADVISORY COMMITTEE RECOMMENDS STEPPED-UP RESEARCH PROGRAM: The American Fisheries Advisory Committee, at its fourth meeting held in Chicago on October 11 and 12, 1956, urged immediate implementation of a greatly expanded and balanced program of technological, biological, economic, and marketing research and services to be financed with the additional money now available under the Fish and Wildlife Act of 1956, U. S. Fish and Wildlife Service Director John L. Farley reported October 23.

The Service Director presided over the meeting as Acting Chairman.

The Saltonstall-Kennedy Act which was passed in 1954 to promote increased production and marketing of domestic fishery products was due to expire on June 30, 1957. The Fish and Wildlife Act of 1956, approved by the President on August 8, extended the provisions of the Saltonstall-Kennedy Act on a permanent basis. The limitation of $3 million annually for research has been removed and the entire amount of 30 percent of gross customs receipts on fishery products now becomes available on an "annual accrual" basis.

The Committee reaffirmed its previous recommendations regarding the use of a series of criteria for judging project proposals on a broad national basis which were developed at its first meeting in April 1955. It recommended continuance of contract research where a specific type of specialized research can best be done by universities or private research organizations. The Committee expressed concern over the ability of industry to outbid the Service in recruiting and holding highly-trained technicians.

The 16 members of the Committee who attend the meeting were: Harold R. Bassett, Salisbury, Md.; Lawrence Calvert, Seattle, Wash.; James S. Carlson, Boston, Mass.; Chris Dahl, Petersburg, Alaska; Mark L. Edmunds, Garibaldi, Ore.; David H. Hart, Cape May, N. J.; Leon S. Kenney, St. Petersburg, Fla.; Donald P. Loker, Terminal Island, Calif.; J. Richards Nelson, Madison, Conn.; Moses Pike, Eastport, Me.; H. F. Sahlman, Fernandina Beach, Fla.; Thomas F. Sandoz, Astoria, Ore.; Arthur Sivertson, Duluth, Minn.; Lawrence W. Strasburger, New Orleans, La.; Earl B. Webster, Brownsville, Tex.; and Alphonse J. Wegmann, Pass Christian Isles, Miss.

Shellfish Sanitation Workshop

The Shellfish Sanitation Workshop, which is primarily a meeting of State Public Health officials with officials of the U. S. Public Health Service, was held in Washington, D. C., August 27-28, 1956.

The objectives of the meeting were: (1) the consideration of revisions for the Manual of Recommended Practices for Shellfish; (2) the development of a workable market index of quality for shellfish; and (3) the formation of an advisory committee that would work with the U. S. Public Health Service and eliminate some of the administrative difficulties presently encountered in carrying out such projects as the manual revision.

The proposed changes for the present draft of the Manual of Recommended Practices were discussed and it was felt that approval by those present represented sufficient authority to allow publication of the manual with the changes agreed upon for use during this oyster season.

The two items of greatest importance to the oyster industry approved for the Manual were the provisions to eliminate galvanized returnable containers effective December 1960 and the provision to eliminate dip buckets for use by shuckers. It was agreed, however, that a container with flowing water could be used by the shuckers for washing their hands while in the process of shucking.

The second day's session was devoted to several technical papers relating to the bacteriological examination of shellfish. One of the papers referred the determination of the uptake and concentration of coliform organisms from waters of known or controlled concentration.

Another paper presented by a representative of the Canadian Department of National Health and Welfare gave the procedure used by Canada for inspection of shellfish imports from the United States. Since there is no market index standard, the Canadians, without any definite basis for the decision, selected an arbitrary maximum of 2,400 coliform per hundred milliliter as defining acceptable oysters. A second class, "acceptable on condition," was defined as shipments with coliform most probable number (MPN) between 2,400 and 160,000. These were accepted but required notification of the U. S. Public Health Service for investigation and remedial action as necessary. An unsatisfactory report or no report led to suspension of future shipments from this shipper. The third class, rejected, consisted of any oysters with MPN in excess of 160,000. They notice a marked geographical difference in the shipments within thse groups. Ninty percent of "Northern" oysters could meet the acceptable 2,400 MPN, but only 15 to 45 percent of "Southern" samples met this standard. "Southern" in this case meant Maryland, Virginia, and Delaware.

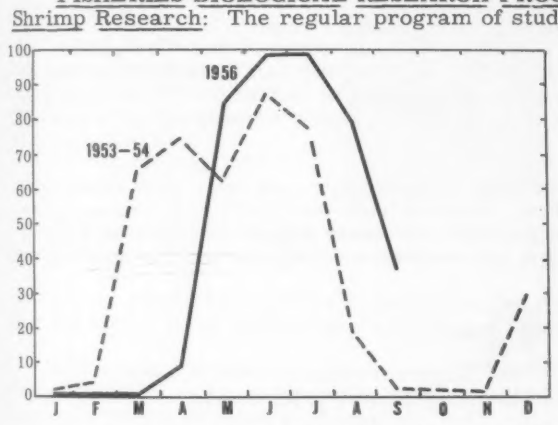
The next report was given by a representative of the New York City Health Department. This group has applied a standard of 2,400 MPN as a maximum acceptable level, but have attempted to preserve a flexible method of application, and to investigate before excluding any shipper from the New York market. He also indicated the feeling of a need for control measures, but uncertainty about, or dissatisfaction with, the selected level.

The afternoon session was given over to a discussion of the morning papers and an attempt to reach an acceptable limit which would permit a reasonable percentage of Chesapeake Bay oysters to be shipped interstate. The market index finally adopted was similar to the Canadian code. The only difference was a compromise, increasing the upper limit for Group 1 acceptable oysters to a coliform MPN of 16,000. The other limits of the Canadian code were retained as is.

It was decided to table any further action on the appointment of an advisory committee until a meeting of the same group in 1957, since the two more important objectives, approval of the manual and establishment of an interim market index, had been satisfactorily acted upon.

South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, JUNE-SEPTEMBER 1956: Shrimp Research: The regular program of study on the shrimp and shrimp industry was continued June-September 1956 at the Bears Bluff Laboratories, according to the Progress Report No. 29 issued by them. Forty-seven experimental drags were made at the regular stations established in 1952. The usual hydrographic information, plus data on size, weight, abundance of each species of marine organisms was tabulated for each drag. In addition 9 experimental trawl hauls were made in deep water offshore by the larger research vessel, the T-19. The number of offshore trips was cut due to bad weather layup for repairs, and the necessity of using the crew on the smaller vessel for inshore work.



Proportions of brown shrimp to total shrimp catch from Bears Bluff Laboratories trawl records.

Records gathered by both research vessels clearly indicate that the shrimp fisheries was almost entirely dependent on the brown shrimp during the period covered by this report. Ordinarily by mid-July and August the relative proportion of brown shrimp drops off as the white shrimp enter the commercial catch. This year in July and August, the brown shrimp accounted for more than 90 percent of the catch. A few white shrimp began to make their appearance in September. The graph indicates the relation of brown to white shrimp in 1956 as compared with laboratory records for the years 1953 and 1954 combined.

A close study of the landings of shrimp from the several hundred commercial fishing boats along the South Carolina coast this year has not been undertaken by Bears Bluff, but from casual interviews with commercial fishermen indicates the relative abundance of white shrimp is decidedly below that of the past few years. This is not universally true along the coast and apparently in a few areas (Georgetown and Charleston) white shrimp are abundant.

Records of the Laboratories' vessels indicate that white shrimp were almost 15 times more abundant in July 1953 and 1954 than they were in 1956; 9 times more in August; and 9 times more in September.

Although no clear-cut reason is apparent for these differences, there are several indications which tend to show that a deficiency of rainfall in the past two years plays an important part in this shortage.

Facilities for Research Improved: An indication of the changes in salinity in inshore environment of South Carolina marine fisheries were noted by a researcher at the Laboratories in July-August 1956. The researcher pointed out that "As a result of the long drought in South Carolina, sea water has filled the streams and moved far up in the rivers and creeks, making formerly low salinity streams into estauries almost as salty as the ocean." The far-reaching importance of such changes influenced The Agricultural Society of South Carolina to grant the greater portion of the necessary funds to Bears Bluff Laboratories to undertake a long-range study on the influence of salinity on marine fisheries. A 535-foot 6-inch well has been sunk in the Laboratories' yard. The County of Charleston will deepen and increase the holding capacity of the fresh-water lake. Pumping water into the lake from the well will allow the storage of sufficient fresh water so that "irrigation" of the salt-water ponds can be achieved. In this way salinity can be reduced in the experimental ponds from full sea strength to any degree of saltiness. Thus the mechanical and engineering requirements of an important research program are already accomplished.

The old 40-foot research boat has been replaced by a new one. A 40-foot cabin cruiser with a Diesel engine has been obtained from the Charleston Transportation Depot of the Army. The official transfer was made August 22. Conversion is in progress. The boat will soon be put into service studying the marine fisheries of the State.

Sport Fishing and Hunting Survey Reveals $3 Billion Annual Expenditures

A total of 25 million American anglers and hunters (1) spent nearly 3 billion dollars for 500 million days of sport, (2) drove their automobiles more than 10 billion miles; and (3) spent an average of $114.42 apiece in the pursuit of these recreations in 1955.

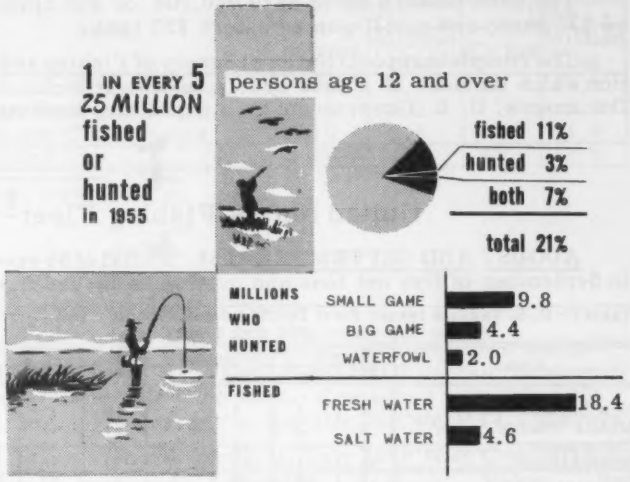
Those facts are among the findings of the first national survey of fishing and hunting ever conducted in the United States. The survey was made under the direction of the U. S. Fish and Wildlife Service at the recommendation of the International Association of Game, Fish and Conservation Commissioners as a basis for a better understanding of the recreational value of hunting and fishing in terms of financial outlays and individual participation, Secretary of the Interior Fred A. Seaton said September 15, 1956.

This project cost $134,000 and was financed through Federal aid funds which are derived from the Federal excise tax on sporting arms and ammunition and on fishing rods, reels, creels, artificial lures, baits, and flies.

The data obtained in the survey pertain to the calendar year 1955 and to persons 12 years old and older. The information is the result of the work of 300 interviewers working in 250 places in the 48 states. About 20,000 homes were contacted in a representative cross section of the Nation and 6,220 anglers and 3,108

hunters interviewed. The survey was carried out by Crossley, S-D Surveys Inc. of New York on a sample scientifically designed to give the national picture.

The survey showed that: (1) one American household out of every three had at least one member who hunted or fished or who did both; (2) one house in every two in the rural areas and one out of every six in the big cities have at least one person who casts a line or draws a bead; (3) one out of every five Americans 12 years old or older either hunted or fished.



Hunting and fishing appeal to all age groups from 12 years to 65-plus but seems slightly more popular in the age groups, 12-17 and 35-44. Hunting appeal holds relatively steady through the groups from 12 years to 44 years and then the number of nimrods begins to decline.

Of the 118,366,000 individuals aged 12 and over in the United States the survey found that 24,917,000 hunted or fished or did both.

There were 13,133,000 who fished only; 4,104,000 who hunted only; and 7,680,000 who did both. Five million women fished and nearly half a million hunted.

More than 7 million anglers--mostly salt-water fishermen, women and youths--did not need to obtain a license to fish. (In nearly all coastal States, salt water fishing does not require a license.)

Fresh-water fishing (18,420,000 anglers averaging 18 days apiece) and small game hunting (9,822,000 hunters averaging 12 days apiece) are the most popular of the fish and game sports.

Nearly 4.5 million big-game hunters averaged seven days apiece in quest of their quarry; nearly 2 million sought out the waterfowl on the many marshes; and more than 4.5 million anglers sought their catches in the salt-water sport fisheries.

The 24,917,000 who hunted and fished spent $2,851 million in pursuit of this sport, an average of $114.42 apiece. Of the total amount, $1,282,300,000 was spent for equipment; $1,298,800,000 for food, lodging, and transportation on hunting and fishing trips; $81,300,000 for the various licenses including duck stamps; and $188,600,000 for all other expenses. The individual spent an average of $51.46 for equipment; $52.13 on trips; $3.26 for licenses; and $7.57 for miscellaneous expenses.

The 20,813,000 anglers spent slightly more than $1,914,000,000, while the 11,784,000 hunters spent $936,687,000. The average fisherman spent $91.98 and the average hunter spent $79.49. More than 7 million of these individuals both hunted and fished which accounts for the general average of $114.42 per person spent in 1955 for this type of recreation.

There was wide variation in expenditures on a regional basis. The salt-water fisherman on the Pacific Coast--1,137,000 of them--spent $156 each while their salt-water counterparts on the Atlantic and Gulf Coasts spent $91 each. The average of all salt-water anglers was $107 per person while the average expenditure by the fresh-water angler was $77.

The duck hunters spent $119,000,000 or $60 apiece; big-game hunters expended $73 each; and small-game hunters $50 each.

The complete report (National Survey of Fishing and Hunting) is a 52 page publication which includes 20 charts and 18 tables. It is for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 40 cents a copy.

United States Fishing Fleet[1/] Additions

AUGUST AND SEPTEMBER 1956: A total of 55 vessels in August and 34 vessels in September of five net tons and over were issued first documents as fishing craft.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft, by Areas, August-September 1956 With Comparisons

Area	August		September		Jan.-Sept.		Total
	1956	1955	1956	1955	1956	1955	1955
	(Number)						
New England	2	1	1	-	13	16	18
Middle Atlantic	2	2	-	-	21	11	13
Chesapeake	9	5	12	2	87	34	54
South Atlantic	19	7	12	3	92	50	65
Gulf	12	14	6	8	83	77	103
Pacific	5	15	1	6	68	107	117
Great Lakes	-	1	-	1	2	7	9
Alaska	6	5	2	1	39	31	35
Hawaii	-	-	-	1	-	3	3
Virgin Islands	-	-	-	-	-	-	1
Total	55	50	34	22	405	336	418

Note: Vessels assigned to the various sections on the basis of their home ports.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, by Tonnage, August and September 1956

Net Tons	Aug.	Sept.
	(No.)	
5 - 9	29	20
10 - 19	11	6
20 - 29	6	2
30 - 39	7	6
70 - 79	1	-
100 - 109	1	-
Total	55	34

The total for August 1956 was higher by 5 vessels than for the same month in 1955. The September 1956 total exceeded that for September 1955 by 12 vessels. During the two-month period, the South Atlantic area led all others with a total of 31 craft, followed by the Chesapeake Bay area with 21, the Gulf of Mexico 18, Alaska 8, Great Lakes 6, New England 3, and the Middle Atlantic 2.

1/ Includes both commercial fishing and sport fishing craft.

U. S. Fish Stick Production

JULY-SEPTEMBER 1956: During the third quarter of 1956, the United States production of fish sticks by 38 manufacturers totaled 11.5 million pounds. This was 2.4 million pounds (18 percent) less than the quantity produced during the corresponding period of 1955 are only 1 percent above the 11.4 million-pound output of the second quarter of 1956.

Table 1 - U. S. Fish Sticks Production

Month	Cooked	Uncooked	Total
	(Million Pounds)		
July	2.8	0.4	3.2
August	3.5	0.6	4.1
September	3.6	0.6	4.2
Total 3rd Quarter:			
1956	9.9	1.6	11.5
1955	12.5	1.4	13.9
Total Jan.-Sept:			
1956	34.8	4.7	39.5
1955	44.3	5.7	50.0

Production during the third quarter of 1956 averaged 3.8 million pounds a month as compared with an average monthly production of 4.7 million pounds during the third quarter of last year. The largest quantity of fish sticks ever produced during a single month occurred during March 1955 when 7.4 million pounds were packed.

During the third quarter of 1956, 86 percent of the total production was precooked and 14 percent uncooked. During this same quarter, 23 manufacturers located in the Atlantic Coast States produced 9.5 million pounds or 81 percent of the total. Plants located in the interior of the country and in the Gulf States manufactured 1.2 million pounds of fish sticks and firms situated in the Pacific Coast States produced 836,000 pounds.

Table 2 - U. S. Fish Sticks Production by Areas
July-September 1956 and 1955

Area	July-September			
	1956		1955	
	Firms	Million Lbs.	Firms	Million Lbs.
Atlantic Coast States	23	9.5	28	10.9
Interior & Gulf States	5	1.2	7	1.6
Pacific Coast States	10	0.8	12	1.4
Total.....	38	11.5	47	13.9

Note: Also see Commercial Fisheries Review, August 1956, p. 50.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JULY 1956: United States imports of edible fresh, frozen, and processed fish and shellfish in July rose 21.7 percent in quantity and 11.2 percent in value as compared with June 1956. Compared with July 1955 the imports for July 1956 decreased 3.4 percent in quantity, but were 17.7 percent higher in value. July 1956 imports averaged 30.8 cents a pound as compared with 25.3 cents a pound for the same month in 1955 because of the higher prices prevailing for many imported fishery products.

United States Foreign Trade in Edible Fishery Products, July 1956 With Comparisons

	Quantity			Value		
	July		Year	July		Year
	1956	1955	1955	1956	1955	1955
Imports:	(Millions of Lbs.)			(Millions of $)		
Fish & shellfish: Fresh, frozen, & processed 1/.....	71.1	73.5	769.9	21.9	18.6	206.4
Exports:						
Fish & shellfish: Processed 1/ only (excluding fresh & frozen).....	5.9	4.8	01.0	1.3	1.2	21.6

Note: Includes pastes, sauces, clam chowder, and juice, and other specialties.

Exports of processed fish and shellfish in July 1956 declined about 9 percent compared with the previous month, but were 23 percent above the same month in 1955. The July 1956 value of these exports was the same as the previous month, but was higher by 8.3 percent than for the same month a year ago.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA PROVISO: The quantity of tuna canned in brine which may be imported into the United States during the period from April 16 through December 31, 1956, at the 12½-percent rate of duty is limited to 28,757,393 pounds. Any imports in excess of that quantity will be dutiable at 25 percent ad valorem.

Imports under the quota for the period from April 16 through September 29, 1956, amounted to 20,745,940 pounds, according to data compiled by the Bureau of the Customs. This leaves a balance of 8,011,453 pounds of the quota which may be imported in the last months of 1956 at the 12½-percent rate of duty.

A proclamation, issued by the President on March 16, 1956, gave effect to an exchange of notes with the Government of Iceland to withdraw tuna canned in brine from the 1943 trade agreement and invoked the right to increase the duty reserved by the United States in negotiations with Japan and other countries under the General Agreement on Tariffs and Trade.

The quota is based on 20 percent of the previous year's United States pack of canned tuna, prorated to account for the months that had elapsed during 1956 before April 16, the effective date of the action.

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IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS JANUARY-JULY 1956: Fillets: Groundfish fillet imports in July 1956 were up 22 percent over a year ago. Total fillet imports the first seven months of 1956 were 33 percent greater.

Imports of blocks and slabs of groundifsh reversed the general trend noted earlier in the year--July imports were 57 percent above a year earlier. Imports for the first seven months of 1956 were, nevertheless, 28 percent less than in 1955.

Swordfish: July imports were 6 percent less than a year earlier, and the first seven months total was 11 percent less than a year earlier.

Tuna: There was an over-all decline in frozen tuna imports, but an increase in canned tuna. Fresh or frozen tuna: due to a drop of some 10 million pounds in albacore, July tuna imports were 49 percent less than a year ago. First seven months 1956 total tuna imports were 20 percent below a year ago; only half as much albacore was received but 9 percent more of other species. Canned tuna: July imports, practically all canned in brine, were 26 percent more than a year earlier. First seven months 1956 total imports were up 22 percent, canned albacore tuna was up 29 percent, other species 18 percent.

Bonito and Yellowtail: July imports 40 percent less than a year ago. Total imports for first seven months this year were down 15 percent.

Salmon: Canned salmon imports continued to gain, frozen salmon declined. Frozen salmon imports during July were 23 percent less; seven months total down 49 percent against last year. Canned salmon: July imports were about three times those of a year ago; seven months total 8 times that of 1955. Principal gain in imports was from Japan, but also due to tripled Canadian imports.

Sardines: In line with the previous trend, July imports down 86 percent from year ago. Imports during first seven months were 20 percent less.

Shrimp: July imports exceed year ago by 24 percent. Total for year through July was 48 percent greater. Principal gain in imports was from Mexico, but Panama, Ecuador, and Japan all showed substantial increases over year ago.

Lobster: Canned imports for first seven months down 2 percent. Frozen lobster July imports 20 percent greater than a year ago. Total for first seven months up 6 percent. Imports from Canada and Mexico less than a year ago. Increases principally from Union of South Africa, New Zealand, and Cuba.

Crab Meat: Canned July imports were double those of a year ago. Imports for year through July increased 65 percent.

Fish Meal: July imports down 15 percent. Receipts for first seven months 5 percent more than previous year.

Exports: Little change in exports of fishery products during July. Imports for year through July were 83 percent less for canned salmon, 11 percent more for canned sardines and 27 percent more for fish oils.

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GROUNDFISH FILLET IMPORTS DECLINE IN SEPTEMBER 1956: A total of 9.1 million pounds of groundfish (including ocean perch and fish blocks) was imported in the United States during September 1956. Imports of these products during the like period of 1955 amounted to 10.4 million pounds. The decline of 13 percent was caused primarily by lighter receipts from Canada (down 32 percent) which offset the 1.7-million-pound increase in fillets from Iceland. Imports from Norway and the Netherlands also were somewhat larger while receipts from Denmark and West Germany were less than in September 1955.

Groundfish and ocean perch fillets received from Canada during September 1956 amounted to 6.1 million pounds--67 percent of the month's total receipts. Iceland accounted for 28 percent of these imports while the remaining 5 percent were received from Norway, Denmark, the Netherlands, and West Germany.

Thirteen countries exported 103.0 million pounds of groundfish and ocean perch fillets to the United States during the first nine months of 1956, compared with 97.7 million pounds during the corresponding period of 1955. Canada (68.1 million pounds) led all other countries and accounted for 72 percent of the nine-month total imports. Iceland (17.4 million pounds) was in second place, followed by Norway (2.7 million pounds), Denmark (2.5 million pounds), and West Germany (1.7 million pounds).

Note: See Chart 7 of this issue.

White House Pays Tribute to Fishing Industry

In a telegram addressed to the Chairman, National Fish Week Committee, the President, on October 16, congratulated the Fishing Industry for its efforts and contributions to the National Economy. The telegram reads as follows:

> "To the Fishing Industry of America, I send greetings. Every part of your industry contributes its share to the National Economy and to the nutritional well-being of our citizens. The combined work of fishermen, processors, and distributors enables this country to enjoy the widest variety of fish and shellfish in the world.
>
> "My congratulations go to your 87,000 Commercial Fishermen and to the Fishing Industry which supplies the nation with more than four and one half billion pounds of sea food every year.
>
> /s/ Dwight D. Eisenhower"

Wholesale Prices, September 1956

Catches in September 1956 of fish and shellfish were about normal for this period of the year. Seasonal declines for some East Coast varieties, light supplies of Pacific salmon, and the Pacific halibut fishery approaching the end of a drawn-out season were balanced somewhat by greater landings of shrimp. There was little change in the average wholesale price for all edible fish and shellfish during the

month. The September 1956 index (114.3 percent of the 1947-49 average) for all edible fish and shellfish (fresh, frozen, and canned) declined only 0.3 percent from August 1956, but was higher by 4.7 percent than for September 1955.

Landings of the leading fresh finfish in September declined. Compared with the previous month, wholesale prices for Great Lakes whitefish were up sharply and the market for fresh haddock, salmon, and halibut continued firm. The index for the drawn, dressed, and whole finfish subgroup in September was 1.1 percent above that for August and 6.1 percent above September 1955. The very high indexes for fresh-water whitefish and yellow pike in September 1955 were due to the strong Jewish holiday market occurring in that month, but were offset by the lower haddock, salmon, and halibut prices.

Although landings of large drawn haddock at Boston were relatively light this September, those of small haddock (which are usually filleted), were good. Wholesale prices this September for fresh drawn haddock and fresh haddock fillets held

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, September 1956 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices1/ ($)		Indexes (1947-49=100)			
			Sept. 1956	Aug. 1956	Sept. 1956	Aug. 1956	July 1956	Sept. 1955
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					114.3	114.6	114.6	109.2
Fresh & Frozen Fishery Products:					125.8	126.5	125.9	113.8
Drawn, Dressed, or Whole Finfish:					132.6	131.2	122.5	125.0
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.10	.10	100.1	101.3	92.2	58.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.45	.44	139.2	136.9	122.2	133.1
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.68	.66	151.7	148.3	142.7	140.4
Whitefish,L. Superior, drawn, fresh	Chicago	lb.	.61	.49	151.2	121.5	119.0	235.5
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.74	.65	149.6	131.4	131.4	222.4
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.58	.60	117.8	122.9	122.9	123.0
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.50	.55	117.3	129.0	126.7	211.0
Processed, Fresh (Fish & Shellfish):					126.3	122.2	128.6	107.8
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.29	.29	97.0	97.0	112.3	78.3
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.72	.70	113.0	110.2	126.4	94.5
Oysters, shucked, standards	Norfolk	gal.	6.00	5.75	148.5	142.3	136.1	129.9
Processed, Frozen (Fish & Shellfish):					102.9	114.5	117.7	93.8
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	103.4	103.4	102.1	102.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.28	.28	86.3	86.3	86.3	84.7
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.28	.28	110.8	110.8	109.8	108.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.84	.78	99.2	120.4	126.6	84.1
Canned Fishery Products:					98.0	97.7	98.7	102.7
Salmo, pink, No.1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	22.65	22.65	120.0	120.0	120.0	114.8
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.60	10.60	76.4	76.4	76.4	92.3
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.50	7.50	87.5	87.5	87.5	88.1
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	cs.	7.70	7.50	81.9	79.8	87.3	81.9

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

steady at August levels. Prices at wholesale for fresh 26-30 count shrimp at New York were up slightly and the shucked oyster prices for the new season starting September 1 were about 50 cents a gallon higher. Higher shrimp and oyster prices boosted the September fresh processed fish and shellfish subgroup index about 3.4 percent above August. When compared with September 1955, the September 1956 prices for items in this subgroup were higher by 17.2 percent due to substantially higher prices for all the items in this subgroup.

Frozen fillet prices at the wholesale level were unchanged from August to September, but frozen shrimp prices at Chicago declined 17.9 percent. Prices for frozen shrimp normally start to decline in September due to greater catches of shrimp in the Gulf of Mexico. The rather sharp decline in frozen shrimp prices in September 1956 were probably not as drastic as the index indicates since part of the drop was attributed to the lack of the higher-priced white shrimp on the market during the pricing period. Primarily due to the lower frozen shrimp price, the index for the processed frozen fish and shellfish subgroup declined 10.1 percent from August to September, but was still 8.8 percent above September 1955.

There were no significant changes in canned fishery products from August to September 1956 except for a slight change upward in the wholesale price for canned Maine sardines. The late season pack of Maine sardines has not been up to expectations and the pack, although higher than in 1955, is still below average. The index for canned fishery products in September was only 0.3 percent above that for August, but 4.6 percent below September 1955. When comparing this September's canned fish prices with those for last September, canned tuna prices were substantially lower this year than last, and this more than offset the increases in the three other canned fishery products in this subgroup.

MOTION PICTURES CAN PROMOTE FISH SALES

Industry has found that the motion picture, used as a sales-promotion medium, reaches a great number of consumers in a relatively short period--at low cost as compared to most other advertising media. Food industries which are in competition with the fisheries, such as the meat and poultry industries, are making good use of motion pictures in their advertising campaigns. However the fishing industry is also realizing the important role of the motion picture in sales promotion, and fishery films produced by individual fish companies and through Government-industry cooperation are stimulating daily the demand for fishery products.

Reports received from television stations and the approximately 140 Fish and Wildlife Service film depositories indicate that several million persons a year see the commercial fisheries motion pictures produced and distributed by the Service.

The Service has a program whereby it will cooperate with any segment of the fishing industry desiring to finance the production and distribution of motion pictures: For example, the most recent reports received from Service film libraries show that a sound, color, 16mm. film produced about eight years ago by the Service, in cooperation with the Maine sardine industry, has been in constant distribution during those years and has had a larger audience every reporting period. This film has averaged about one television showing a week during these years and, in addition, about 300,000 persons see it each year by obtaining library prints. The effectiveness of the program is best evidenced by the fact that the Maine sardine industry is sponsoring a follow-up industry-Government film, cooperatively-produced, featuring the use of Maine sardines in hot and cold dishes. Similar films have been produced cooperatively with the shrimp, menhaden, and other industries related to the fisheries.

The Service fishery motion pictures are distributed free of charge to the public and, with the exception of the initial cost of production and the prints, the motion picture assistance is free of charge to the segments of the industry which sponsor the production of the film. Eleven fishery market development motion pictures are now in distribution and three are currently in production. Fishery Leaflet 255, entitled Fishery Motion Pictures, contains the titles and a description of each film as well as information as to how they may be borrowed free of charge. This leaflet may be obtained by addressing requests to the U. S. Fish and Wildlife Service, Washington 25, D. C.

International

BALTIC SALMON FISHERIES CONVENTION PROPOSED: A proposed convention to regulate salmon fisheries in the Baltic Sea was discussed informally between Swedish and West German government officials in Hamburg in July 1956. Only partial agreement could be reached. Germany objected to the institution of a closed season on the grounds of insufficient scientific evidence to prove its necessity, and because of fears of economic repercussions in the German salmon fishery, according to an August 29 report from the United States Consulate at Bremen.

In July 1956 two representatives of the Swedish government visited Hamburg to discuss unofficially salmon fisheries in the Baltic Sea with the West German Food Ministry.

Swedish fisheries are deeply concerned by the decline of salmon stocks in the Baltic Sea, in spite of their large-scale breeding efforts and the release of young salmon in these waters. Therefore, the Swedes are interested in establishing an international convention regulating catching techniques, minimum sizes, and a closed season. Sweden has already approached Denmark in this matter and wishes to include West Germany in the proposed convention.1/

It was found that with regard to catching techniques and the minimum size of the salmon to be caught an agreement could be reached relatively easily. However, West German opinions about the necessity and extent of a closed season differed widely from those entertained by the Swedes. West German experts assert that scientific data concerning salmon stock development in the Baltic Sea are not sufficiently complete to warrant such a step, the more so since it would have considerable repercussions on West German salmon fishery activities. The proposed closed season, which would last from December 20 until February 28, would probably cut the West German salmon catch to about half of its present volume. German fishery experts see no way of compensating such a loss.

In view of these facts it was agreed to suspend the problem of a closed season for the Baltic salmon fisheries. The Copenhagen headquarters of the International Council for Marine Research will be asked to conduct a thorough investigation of salmon stocks, their development, movements and all other questions involved. The Council's findings and final report will serve as a basis for further talks.

1/ According to the Bulletin Statistique of the Conseil Permanent International pour l'Exploration de la Mer, volume XXXVIII/ 1953, salmon catches in 1953 amounted to: Denmark 753 metric tons, Sweden 413, Finland (incl. trout) 350, West Germany 75; total catch 1,591 metric tons.

AGREEMENTS

ICELAND AND CZECHOSLOVAKIA AMEND 1954 TRADE AGREEMENT: Iceland and Czechoslovakia on August 14, 1956, signed a new annual Protocol to their Trade Agreement of 1954. It is beleived that total exports to Czechoslovakia will be about 25 percent over 1955 and 61 percent over 1954. Imports are expected to be 13 percent over 1955 and 51 percent over 1954. The volume of fishery products to be exported from Iceland will be 30 percent higher in 1956/57 then for the preceding year and 53 percent higher than in 1954/55. The table gives the exports since the agreement was made.

Icelandic Exports of Fishery Products Under Iceland-Czechoslovakia Trade Agreement						
Product	FY1956/57	FY1955/56	FY1954/55	FY1956/57	FY1955/56	FY1954/55
	(Metric Tons)			(US$1,000)		
Fish fillets, frozen	7,000	8,000	6,000	2,760	2,854	2,140
Herring, salted and frozen	3,500	1,000	2,000	500	185	369
Fish meal	2,000	1,000	500	360	154	77
Fish oil	500	-	-	111	-	-
Total	13,000	10,000	8,500	3,731	3,193	2,586

The figures in the table do not include frozen fillets and fish meal to be shipped to Czechoslovakia to service and repay the credit granted for purchase of hydroelectric machinery early in 1956.

Note: Values converted at the rate of 44.21 Czech crowns equal 100 Icelandic kronur and 1 Icelandic krounur equals US$0.0615.

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ITALY AND YUGOSLAVIA SIGN AGREEMENT ON FISHING IN THE ADRIATIC: The lack of a fishing agreement has been a source of irritation and incidents, with the Yugoslavs impounding Italian fishing boats when caught fishing in Yugoslav waters. An agreement permits Italian fishing from September to April in certain zones of the Adriatic near the Pelagruz and Kajol islands, westward to the island of Viz and near the Jabuka and Kamik islands. Along the upper part of the west coast of Istria, 35 "stationary" Italian vessels are to be permitted to fish from November to April at a distance of four miles from the Yugoslav coast. The Yugoslav sea area which is now open to Italian fishing vessels is almost one-half of the area fixed under the 1949 agreement and Yugoslav waters are completely protected along the entire sea board for a distance of 10 miles from the coast with the exception of the areas included in the agreement; (in addition to 6 miles of territorial waters there is also a 4 mile protective belt). The agreement extends only to October 1957, so that with most of the 1955/56 season passed it involves little more than one full season. However, prospects exist that the fishing agreement will be extended for an additional year, points out a March 12, 1956 dispatch from the United States Embassy in Belgrade. The agreement also provides for a joint fishing zone in part of the Trieste gulf, the possibility of Italian purchases of fish from Yugoslav waters, and proposes joint efforts in developing deep sea fishing.

GENERAL AGREEMENT ON TARIFFS AND TRADE

11th SESSION IN GENEVA: Recent developments in the economic field will be reflected in discussions at the eleventh session of the Contracting Parties to the General Agreement on Tariffs and Trade (GATT) which opened in Geneva October 11, 1956.

For example, proposals for the establishment of a common market or customs union for Benelux, France, the Federal Republic of Germany, and Italy are now being studied in Brussels. In Paris, a working party established by the Organization for European Cooperation (OEEC) is examining the possibility of creating a free-trade area to include the countries forming the proposed customs union and other OEEC member countries. The Contracting Parties will be concerned as to the obligations under the GATT of member countries of GATT which decide to participate in any such customs union or free-trade area.

It has been proposed that there should be a general opportunity for consultations among GATT parties on the quantitative import restrictions which they are still maintaining for balance-of-payments reasons. At this session plans for such consultations are likely to be drawn up, but the actual consultations would be started at a later date. During the session the customary consultations with certain countries on the discriminatory application of their import restrictions will be held, and developments in the OEEC's trade liberalization program will be reviewed.

Switzerland, which is not now covered by the GATT, has signified its intention to apply for accession to the General Agreement, and this request will be discussed during the session.

In the field of customs tariffs there will be an examination of questions likely to arise if the new Brazilian customs tariff is approved by the Brazilian Congress. Other questions related to customs administration will also be studied.

The Contracting Parties will examine reports received on the functioning of the waivers from specific GATT obligations that have been granted to certain countries from time to time. A short list of complaints of violations of obligations will be dealt with under the appropriate GATT procedures. The position of Japan vis-a-vis the 14 contracting parties which are not undertaking GATT obligations toward her will also be reviewed.

In the field of commodity trade, the Contracting Parties will consider the present position on the proposed establishment of an international agreement on commodity arrangements and the possibility of any alternative approach to the question of commodity trade. Developments during the past year in the disposal of surplus agricultural products will be reviewed.

It is expected that representatives will be present from about 50 countries, including 35 GATT parties and observer governments; in addition, about 8 intergovernmental agencies will be represented.

The 35 parties to the General Agreement on Tariffs and Trade--which provides a code of fair-trade rules for nations accounting for 80 percent of world commerce--are: Australia, Austria, Belgium, Brazil, Burma, Canada, Ceylon, Chile, Cuba, Czechoslovakia, Denmark, Dominican Republic, Finland, France, German Federal Republic, Greece, Haiti, India, Indonesia, Italy, Japan, Luxembourg, Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Peru, Federation of Rhodesia and Nyasaland, Sweden, Turkey, Union of South Africa, United Kingdom, United States, and Uruguay.

FOOD AND AGRICULTURE ORGANIZATION

MODERN DIVING AIDS MAY INCREASE SHELL PRODUCTION: Modern diving aids (such as goggles, swim fins, exposure suits, and underwater breathing devices) may help increase the production of trochus and mother-of-pearl shells in the Red Sea, if the recommendations made in a report to the Government of Sudan by the Food and Agriculture Organization (FAO), Rome, are adopted.

Such aids, states the report, could, if the fishermen were thoroughly trained in their use, "increase their efficiency and bring under exploitation untouched shell beds beyond the depth of 30 feet, which is the practical limit of present diving activities."

This is only one of a lengthy list of recommendations contained in the report. Others are concerned with the improvement in boats, gear and methods, handling of fish, government activity, training of personnel, etc. Specifically, they cover the use of deep water lines, net fishing in shallow water, multiple trolling with artifical lures, fishing with lights at night, using floating long lines, set long lines, nylon drift nets and trammel nets, and a plan of work for a FAO expert to take up in the Sudan.

The report, on the basis of a brief reconnaissance survey made in July 1955, also includes drawings and specifications for an improved mechanized felukka.

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NEW DIRECTOR GENERAL ELECTED: Shri B. R. Sen, Ambassador of India to Japan, was elected Director-General of the Food and Agriculture Organization (FAO) on September 20, after two ballots by the 74 member nations failed to produce a majority September 18.

Before the vote was taken, the United States nominee, John H. Davis, Director of Program in Agriculture and Business at Harvard University Graduate School of Business Administration, announced that he had withdrawn from the race.

Assistant Secretary of Agriculture Earl Butz, who is the United States representative at the FAO conference, said that the United States would abstain from voting in the third ballot, and that no attempt would be made to influence those who previously voted for Davis. He said his government had the fullest confidence in the remaining candidates, and pledged full United States support to the new Director-General.

Ambassador B. R. Sen said at a press conference September 20 that he will return to Rome about the end of November 1956 to take office as FAO's Director-General.

He told correspondents that the less-developed areas of the world, in both hemispheres, "need special attention," and that FAO's work will be in that direction "without neglecting the work which is being done in the more-developed areas."

The 74-member body adopted the report of the Council, the 24-nation group which conducts the Organization's business between regular sessions of the Conference, and adopted a Cuban resolution expressing its confidence that the new Director-General will be able to find a solution to existing internal problems.

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WORLD FISH PRODUCTION RISING: Continued progress in mechanizing fishing boats and gear and in improving the marketing of fish and fish products in underdeveloped countries is forecast by the Food and Agriculture Organization (FAO) in a chapter on world fisheries in the FAO report on "The State of Food and Agriculture 1956."

The report, published early in September 1956, contains a comprehensive survey of the world food situation. The chapter on "World Fisheries; General Trends and Outlook With Examples from Selected Countries," deals with production, consumption, utilization, trade, technical development, government fishery policies, etc., and cites specific examples from Japan, Norway, Iceland, United Kingdom, Germany, United States, Canada, Union of South Africa, and South-West Africa. A section is devoted to the situation in the more-developed and the less-developed fisheries.

Amont the interesting facts and figures quoted in the report are those concerned with world production of fish, crustaceans, mollusks, etc., which has risen from about 22 million metric tons in 1938 to "a level ranging between 27 million and 29 million tons in the years 1952 to 1955."

Six of the world's biggest producers--China, Japan, Norway, United Kingdom, United States, and U. S. S. R.--account for about 50 percent of the world's total production, while seven other countries--Canada (including Newfoundland), France, India, Indonesia, Germany, Spain, the Union of South Africa (including South-West Africa)--account for about 16 percent of the world catch.

A few species of fish provide the bulk of the catch. For example, one-quarter of the grand total consists of herrings, sardines, anchovies, menhaden, pilchards, etc., "while the cods, hakes, haddocks, etc., account for approximately 4 million tons, i.e. about one-sixth of the total."

Although fish provide a natural rich source of animal protein, fish and fish products do not provide more than about 10 percent of the world's total consumption of animal protein. But this percentage varies according to the level of food consumption in various areas of the world.

"Even a low level of fish consumption represents the main part of animal protein intake in Indonesia, the Philippines, part of India, Thailand, and other countries," the report says, "while even a relatively high level represents only a small part of the animal protein intake in the United Kingdom, Germany, Norway, Denmark, etc. Japan and Iceland are exceptional cases where the main part of the animal protein intake is supplied from fish."

The report indicates that, with increased knowledge of stocks and resources and improvement in fishing boats, gear, and methods, world production of fish and fish products is likely to continue to increase and provide, perhaps, a more substantial part of the diet of people, especially in the less-developed countries.

GREAT LAKES FISHERIES COMMISSION

FIRST ANNUAL MEETING: The International Great Lakes Fisheries Commission, set up to direct sea-lamprey control, was scheduled to hold its first annual meeting at Ann Arbor, Mich., late in November.

The six-member Commission recently announced it will receive approximately $1 million to begin its work. More than $600,000 will be supplied by the United States Government and about $300,000 will come from the Canadian Government. The Commission said these amounts represent the approximate ratio of water controlled by the two governments.

The Commission will make use of the research agencies of the two nations in granting funds for research, according to James W. Moffett, who serves as temporary Executive Secretary of the Commission.

"We will continue with the electrical barrier defense against the sea lamprey," Moffett said, "and will continue working on the 'selective poisons' that are still in the laboratory state."

NORTHWEST ATLANTIC FISHERIES COMMISSION

NORTHWEST ATLANTIC FISHERIES TRENDS, FOR FIRST PART OF 1956: News from the Northwest Atlantic Convention area indicates that fishing was in general better this year than a year ago, according to the September 1, 1956, Newsletter from the International Commission for the Northwest Atlantic Fisheries.

Canada: Statistics for the Canadian Atlantic fishery for the first five months of 1956 as compared to the same period last year show a very small increase (3 percent) in cod landings. However, a very considerable increase (about 40 percent) in haddock landings was reported, due principally to increased landings in Newfoundland, but the Nova Scotian landings also show a considerable increase. The ocean perch landings decreased about 30 percent.

Denmark: The Danish factory vessel Greenland is in West Greenland waters this year producing fillets of cod, halibut, and wolffish, for direct export from Greenland to the United States. The production this year is reported to be somewhat higher than the previous year.

A fishing vessel from a Danish home port (Esbjerg) is fishing cod off West Greenland waters this year. The last year that vessels from Danish home ports (apart from the factory vessel Greenland) fished at West Greenland was in 1951.

Norway: Several of the Norwegian vessels which have been fishing in West Greenland waters this summer have returned to Norway. The fishery is reported to have been better than in 1955.

Portugal: Some of the Portuguese trawlers fishing on the Grand Banks returned to Portugal with full cargoes. In general the trawlers caught more cod this year than in 1955. The Portuguese liners also reported good catches. Some are reported to have caught within the same period about double their catch in 1955.

Argentine Republic

EAST GERMAN TRADE AGREEMENT WITH ARGENTINE FISH INDUSTRIES AND COOPERATIVES: According to a West German trade journal publication (Allgemeine Fischwirtschaftszeitung, Bremerhaven), the Government of the German Democratic Republic has prepared a trade agreement with an Argentine group of fish industries and cooperatives in Mar del Plata. The agreement will be valid for a period of five years. The total value of the commodities involved will amount to 500 million pesos (about US$66 million).

Under this agreement the contracting Argentine industries will supply to the German Democratic Republic among other things 20,000 metric tons of fish meal, 2,000 tons of "merluza" (dried cod), 50 million cans of sardines, 50 million cans of mackerel, and other types of canned fish. In return the German Democratic Republic will supply fishing gear in the value of 300 million pesos (US$40 million). These supplies will include 30 medium-size trawlers, 50 motor vessels for coastal fisheries (both types equipped with modern navigation instruments including radar), nylon fish nets, electrical sounders, radiotelegraphic equipment, refrigeration plants for canning factories, refrigerated trucks, machinery for cod drying, and several complete fish-meal plants. Further, tools for fish processing, packing material, and machinery for fish canning will be supplied.

Similar agreements are reportedly being negotiated between Argentina and Hungary and Argentina and Czechoslovakia, reports the United States Consulate at Bremen in an August 29, 1956, dispatch.

Australia

DEVELOPMENT OF FISHING INDUSTRY IN PAPUA AND NEW GUINEA PLANNED: A plan to develop the fishing industries of Papua and New Guinea was announced on August 23 by the Australian Minister for Territories. At the present time the commercial fisheries are underdeveloped, according to a September 13, 1956, dispatch from the United States Embassy in Canberra.

The aims of the Australian Government are to increase shell production and exports, to reduce imports of fish and, eventually, to export fish.

The main points of the plan, which will be implemented by the Division of Fisheries of the Territory Department of Agriculture, Stock and Fisheries, are:

(1) Introduction of improved fishing techniques to native fishermen, including distribution to them of fishing gear; (2) The training of native fishermen ashore and as crews of Administration vessels in all aspects of fishing; (3) Encouragement of indigenous people to organize their activities to increase their consumption and trade in fish; (4) The recruitment and training by the Administration of indigenous people as Native Fishery Assistants to be established in appropriate areas to assist native fishermen.

Commercial fishing enterprises by European and native fishermen would be encouraged where they would not conflict with village communities dependent on fishing. A marine biological station would be established when appropriate to support all aspects of the fisheries development plan.

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JAPANESE PEARL-SHELL FLEET OPERATES OFF NORTHERN AUSTRALIA: A Japanese pearling fleet is again operating in the northern waters of Australia this season.

The Australian Minister for Primary Industry said the fleet comprised one mothership, 21 luggers, and one Government inspection vessel. The Japanese will conform to the conservation regulations laid down under the Pearl Fisheries Act. The Commonwealth Government fixed the same maximum take as last year--1,000 tons of mother-of-pearl shell.

The Japanese vessels are allowed to operate in the waters of the Northern Territory Division outside a 10-mile radius of the mainland and inhabited islands. One particular area, however, is reserved for Darwin-based fleets and maximum catch limits are fixed for two other defined areas. The Japanese are also allowed to operate in two subareas of the Western Australian Division over 120 miles north of Broome and beyond 10 miles from the mainland or an inhabited island, and not normally worked by Australian pearlers (Fisheries Newsletter, July 1956).

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NEW CARGO SHIPS TO INCREASE REEFER SPACE: United States importers of Australian shrimp and tuna will be interested in the improved refrigerated freight facilities to North America which will become available when the two Matson ships, Monterey and Mariposa enter service.

The first ship is scheduled to leave San Francisco in October 1956. They will call regularly at Los Angeles, which will save Australian tuna exporters the present road or rail haul from San Francisco. Sydney will be the normal Australian terminal, but the ships will call at Melbourne four times a year.

Each ship will have 30,254 cubic feet of reefer space and will be equipped with modern handling gear, including conveyors running cargo direct into the reefer holds. The ships will call at Pago Pago, where one of America's largest tuna packers operates a cannery.

The freight rate for raw tuna is US$3.85 a 100 pounds, but shrimp come under the general reefer rate of US$64.90 per 40 cubic feet to either the western or eastern coast of America.

The shipping firm owns four of the leading hotels in Hawaii which are reportedly anxious to make shrimp and lobster a regular feature of their hotel and ship menus. They have been pleased with the flavor of Australian shrimp.

From Brisbane there are reefer ships for the United States by two shiplines. These ships run to the North American east coast (Fisheries Newsletter, July 1956, published by the Australian Commonwealth Director of Fisheries).

* * * * *

PROGRESS IN QUEENSLAND SHRIMP FISHERY: Recent advances made by Queensland in the catching, packing, and export of shrimp are reviewed in an article by D. H. Plucknose, Secretary, Queensland Fish Board and published in the July 1956 issue of Fisheries Newsletter of the Commonwealth Director of Fisheries. The article states that in 1956 upwards of 60 boats were engaged in the fishery for banana shrimp in the Hervey Bay area (about 180 miles north of Brisbane on Australia's East Coast).

The Queensland Fish Board has provided a two-way radio station at its market at Bundaberg. In addition, a new jetty has been constructed, and special facilities provided for processing workers.

The purpose of installing the radio transmitter was to provide two-way communication between the Fish Board market and vessels so that advance notice of the catch can be obtained prior to landing to allow for more efficient use of the facilities of the port. It was considered also that with the cooperation of boat crews, congestion at the wharf could be avoided.

By arrangement between the Fish Board, Brisbane Weather Bureau, and Postmaster-General's Department, daily weather forecasts are telegraphed to Bundaberg for transmission from the Board's station for the benefit of fishing crews.

With the recent installation of the Board's second snap-freeze unit (the most modern of its type in Australia) at Bundaberg, and on completion of work on the construction of a temporary factory at this center, it is proposed to undertake all the processing of locally-caught shrimp on the spot. This will replace the method followed to date in which processing at this market has been confined to removing the heads, prior to icing the shrimp for railing to the Board's principal market in Brisbane for grading, packing, and freezing. Depending upon results achieved at Bundaberg this season, it is not unlikely that a modern permanent processing establishment will be erected there by the Board before next year's shrimp season begins.

With a view to establishing the shrimp industry in Queensland on a sound basis, the Fish Board in 1954 resumed control of shrimp. Following re-control, the Board in 1955 and again this year has offered the shrimp fishermen a stabilized price for their catch.

Present export requirements are for green shrimp which, with heads off, count no more than 40 to the pound. For green banana shrimp of the required size, delivered to its markets in first-class condition, the Board is paying 1s.10d. (about 20.5 U. S. cents) a pound heads on and 3s. (about 33.6 U.S. cents) heads off. These rates are, of course, subject to variation. The bulk of the green shrimp received by the Board this season to the time of writing have come from Bundaberg and Gladstone, although king shrimp in quantity are expected from the South Coast as the season progresses.

From inquiries made overseas it has been established that the white-meat banana shrimp (so named, though not altogether aptly, because its pale body and yellow legs have been likened to the popular fruit) compares favorably with shrimp supplied to United States markets from the Gulf of Mexico, and to United Kingdom and Continental markets from the Mediterranean and the Far East. It now remains to achieve a streamlined processing procedure which involves the least possible

handling of the product, and in which labor and overhead costs are reduced to a minimum, in order that Queensland shrimp may compete on overseas markets with those from cheaper-labor countries. The availability of machines from overseas for heading and grading is being explored.

In response to inquiries initiated by the Fish Board, numerous approaches have been made by overseas importing interests desirous of handling Queensland shrimp, including merchants in the United States, United Kingdom, South Africa, New Zealand, and Europe. The initial difficulty has been in securing firm offers of prices which, while covering the Board's processing and handling costs, would insure a reasonable return to the producer.

The availability of refrigerated shipping space also presents something of a problem. For example, there is no regular service from Queensland ports to the west coast of America, though fortunately there is a service to East Coast ports. It has not been practicable to anticipate the rate at which shipments could be effected, since a full shipment can only be built up over a period, depending on available catches. The stockpiling of frozen seafoods against possible shipment at a later date is a doubtful proposition.

In forwarding initial trial consignments to both the United Kingdom and the United States, a pack consisting of 4 pounds of cooked shrimp, snap-frozen in a small block of ice, was used, the gross weight of the pack being 6 pounds. This pack was designed essentially to meet the requirements of the catering trade, and was not attractively cartoned as it was not intended for display. From its reception in the United Kingdom it appears there is at least a possibility of establishing a market there for cooked Queensland shrimp. However, the more lucrative dollar-earning American market prefers green shrimp for cooking in a manner to suit the taste of the consumer. The first sizable consignment exported by the Fish Board comprised uncooked, headless shrimp destined for the United States.

Early in June the Pioneer Glen left Brisbane with a cargo of 13,600 pounds (272 cartons) of headless raw-frozen banana shrimp; purchased, processed and packed by the Fish Board, it was scheduled to reach United States markets in mid-July. The bulk of the consignment was offered in New York, but also included was a small sample addressed to Baltimore. Token shipments of cooked shrimp had previously been forwarded to Philadelphia and Los Angeles. Trial packs of green shrimp were recently air-freighted to Chicago, and single-pack samples have been made available to Australian agents for forwarding to their principals in the United States. Thus the American market is being probed at different points to obtain an indication of the most profitable outlets for Queensland shrimp.

The shrimp recently exported were layer-packed in attractively-printed waxed cartons, each holding 5 pounds. The cartons carry the Board's newly-adopted trade brand and each proclaims its content a product of Australia. Ten of these 5-pound cartons are packed in a master carton for shipping. Layer-packing is necessary to meet the requirements of the United States market generally, and each carton is designed to enable the species of shrimp packed in it and the count to be indicated by the packer.

It has yet to be established whether "wet" snap-freezing and cartoning after freezing is preferable from the point of view of processing economy and finished pack to bulk "dry" freezing in low-temperature cold rooms after packing into inner cartons. Glazing after freezing is, of course, desirable in both packs. This can be done by dipping the snap-frozen block before cartoning, or in the case of the pack frozen in the carton by spraying the surface. There appears little doubt that both types of pack are acceptable in the United States. The shrimp shipped by the Board on the Pioneer Glen had been "dry" frozen after packing.

There does not appear to be a firm demand at profitable prices in the United States for shrimp counting more than 40 to the pound with heads off, and the export pack has so far been confined to four grades: 15-20, 21-25, 26-30, and 31-40 count to the pound. The bulk of the banana shrimp packed by the Board so far this season (to the end of May) has been within the 21-25, 26-30, and 31-40 count, with approximately 25 percent more in the 26-30 range than in each of the other two counts. The United States importer prefers the banana shrimp to the tiger shrimp as the stripes of the uncooked tiger are considered unattractive.

There are at least three channels through which the Australian shrimp exporter can reach the United States market. He can sell through an American broker who acts as an agent handling sales to United States merchants and distributing houses on a commission basis. Alternatively, he may prefer to ship through an Australian exporting agent, or to negotiate direct with American fish-handling companies. It has been reported that certain Australian exporting interests are prepared to offer "f.o.b. Australian port" prices for shrimp and this outlet has its advantages to the processing organization in that the exporter accepts the hazards associated with overseas marketing. The merits of selling through a United States broker on a commission basis lie in the fact that the exporter gains the benefit of any increase in United States market prices which may occur when his shrimp are sold. Conversely, his return could be lower than expected should a slump in the market occur.

In addition to the purchase price paid to the fishermen, the Queensland Fish Board has undertaken that, after allowing for its costs, any profits accruing from the export of shrimp will be returned to the fishermen, to be shared on a pro rata basis according to the quantity of shrimp received by the Board from each supplier.

Note: Also see Commercial Fisheries Review, October 1956, pp. 53 & 54.

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WHALING SEASON IN 1956 EXPECTED TO EXCEED 1955 IN VALUE: In 1956 Australian whaling is expected to produce whale products estimated to be valued at over AL2 million (about US$4.5 million) derived from the 1956 quota of 1,990 humpback whales. The 1955 whaling season yielded 15,876.3 tons of oil from 1,840 humpback whales. Assuming that the whalers catch whales of similar oil yield in 1956 as in 1955, it is estimated that 16,956 metric tons of oil will be produced.

The world price (about 98,000 metric tons of 1956 Norwegian Antarctic whale oil were sold for about US$238 a long ton) for whale oil is higher in 1956 due to reduced Antarctic quotas, states the Fisheries Newsletter (July 1956) of the Commonwealth Director of Fisheries. The estimated 1956 Australian production of 16,956 tons of whale oil at US$247 a ton will be worth almost US$4.2 million, an estimated yield of 7,000 tons of meal and solubles at US$100 a ton will bring a total of US$700,000.

Note: (1) Australian pounds converted to US$ at the rate of $2.241 equal AL1.
(2) Also see Commercial Fisheries Review, May 1956, p. 39.

Canada

ANTIBIOTICS APPROVED FOR FISH PRESERVATION: It was announced on October 1, 1956, that the Canadian Department of National Health and Welfare approved the use of antibiotics in the preservation of freshly-caught fish. The drug "Acronize," a derivative of aureomycin, will be added in small amounts to the ice used on board fishing vessels and for the inland shipment of fish and is expected to greatly retard spoilage.

According to the United States makers of "Acronize," the drug is under consideration by United States authorities for use in fish preservation. Until approved by these authorities, however, it is understood that fish preserved by antibiotics may not enter United States markets, states an October 5 dispatch from the United States Embassy in Ottawa. "Acronize" has already been approved in the United States for use on poultry.

A survey conducted between 1937 and 1950 by the Fisheries Research Board of Canada showed that 40 percent of the ocean fish reaching consumers in Toronto, Montreal, and Ottawa had lost their original fresh taste and appearance, though still regarded as edible, points out the October 8 Oil, Paint, and Drug Reporter.

A test in 1954 on 4,000 pounds of cod and haddock fillets shipped 1,000 miles from Halifax to St. Catharines, Ont., in July and August revealed that the most important single thing influencing the quality of such fillets in distant retail markets is the storage period of the fish at sea.

Because it is impractical, and economically speaking impossible, to cut the time during which the fish is stored at sea, scientists at the Canadian Fisheries Experimental Station, Vancouver, B. C., began a search in 1943 for a way to halt the bacterial spoilage of fish aboard ship.

Dr. Hugh L. A. Tarr pioneered research in adapting antibiotics to the role of keeping fish fresh longer. His first tests showed that the antibiotic penicillin was without value for this purpose. As other antibiotics became available, the testing went on. By 1950 Dr. Tarr could see promise in the field and in 1955 he concluded that "Aureomycin" was five times more effective in retarding food spoilage than any other antibiotic available.

The major benefit of "Acronize," therefore, will be to reduce drastically the high deterioration factor in the fishing industry. Not only will it extend the storage life of fish aboard ship, but it will allow the fishing vessels to range farther out to sea to tap new unexplored schools of fish.

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FISHERMEN'S INDEMNITY PLAN: On July 6, 1956, the Fishermen's Indemnity Plan of the Department of Fisheries of Canada completed three years of operations. On that date a total of 3,442 vessel policies were in force, representing a total appraised value of C$7,667,186. Growth during the third year represented

Canada's Fishermen's Indemnity Plan For Vessels

Province	Vessels Insured at July 6, 1956		Net Increase in Underwritings During Year Ended July 6, 1956		Losses Paid During Year Ended July 6, 1956					
					Total		Partial		Both	
	No.	Approx. Value C$	No.	Approx. Value C$	No.	Value C$	No.	Value C$	No.	Value C$
Newfoundland	946	1,013,058	142	8,241	31	25,999	29	6,191	60	32,190
Nova Scotia	835	1,327,951	221	329,021	10	4,947	4	2,287	14	7,234
New Brunswick	118	213,693	25	35,540	-	-	-	-	-	-
Prince Edward Is.	168	154,334	62	58,895	6	2,647	1	149	7	2,796
Maritimes	1,121	1,695,978	308	423,456	16	7,594	5	2,436	21	10,030
Quebec	336	266,850	46	50,050	18	6,723	8	1,490	26	8,213
Atl. Coast	2,403	2,975,886	212	481,747	65	40,316	42	10,117	107	50,433
British Columbia	1,039	4,691,300	390	1,942,043	10	20,996	8	5,216	18	26,212
CANADA	3,442	7,667,186	602	2,423,790	75	61,312	50	15,333	125	76,645

602 vessels, valued at C$2.4 million. During the year, 75 total-loss claims were paid amounting to C$61,312 and 50 partial-loss claims amounting to C$15,333; total indemnities were C$76,645. The insurance in force represents annual premiums of C$76,672. During the fiscal year just closed actual premium revenue amounted to C$72,000 for the country as a whole.

As in the past, the experience in British Columbia was particularly satisfactory in the 12 months ending July 6. There was a net increase of 390 policies in that Province valued at C$1,942,043 while indemnities paid included 10 total losses for C$20,996 and 8 partial losses for C$5,216. In that Province the indemnity rate for total losses was raised from 60 to 70 percent of appraised value and the deductible in the case of partial loss was reduced from 30 percent to 15 percent.

In the Atlantic Coast provinces the total number of insured vessels increased by 212 to reach 2,403 on July 6 valued at just under C$30.0 million. During the year 65 total-loss claims were paid in this area totaling C$40,316 and 42 partial claims were settled for C$10,117.

The present volume of business has been achieved without increasing administrative costs, which while high to provide coastwide coverage, now represent only about 2.5 percent of total appraised value. In the next year it is believed that this figure will drop to 2 percent as volume expands.

In addition to the direct benefits to those fishermen who have suffered total or partial losses, the Plan has made possible the introduction of guaranteed loans to fishermen under the Fisheries Improvement Loans Act, thus reducing interest costs to the fishermen. At the same time commercial insurance rates on fishing vessels have also been reduced, reports the July 1956 Trade News of the Department of Fisheries.

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FISH STICK PLANTS ORDERED BY RUSSIANS: According to press reports, the Soviet Fisheries Minister announced at a farewell press conference in Ottawa on September 18 that orders had been placed with a firm in Toronto for C$4-5 million worth of fish stick plants. The announcement was made at the end of a three-week tour of Canada by the Soviet fisheries delegation headed by Minister Ishkov.

The fish stick plants, at a cost of about C$380,000 each, will consist of complete processing equipment from the machine that handles the frozen blocks down to the frozen packaged product. The first complete plant is expected to be delivered in about six months. The others will follow subject to modifications to meet Soviet requirements.

Negotiations are under way with other Canadian firms for other types of fish-processing machinery and refrigeration equipment. In addition, the Soviets are interested in buying a fleet of trawlers built along the lines of a new experimental trawler under construction in British Columbia, according to a dispatch dated September 21 from the United States Embassy in Ottawa.

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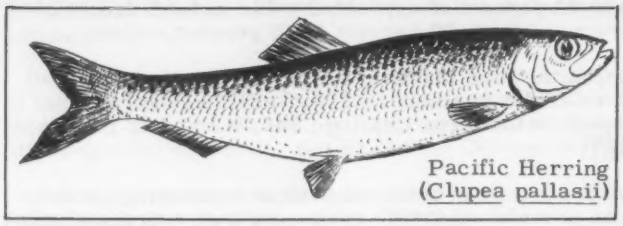
REVIEW OF 1956 HERRING FISHERY IN BRITISH COLUMBIA: Because of the phenomenal catch of 92,067 short tons in the Queen Charlotte Islands, the British Columbia herring industry experienced a record season, according to a report ("Amount of Herring Spawn Deposited in British Columbia Coastal Waters in 1956") by the Fisheries Research Board of Canada Pacific Biological Station at Nanaimo. Over 250,000 tons of herring were caught and processed. In spite of the loss of potential spawners due to the fishery, the most serious being in the south central subdistrict, it is considered that sufficient fish either escaped the fishery or other schools moved inshore after the close of the fishing season to maintain an adequate spawning population in all subdistricts to insure the maintenance of the fishery.

During the past four seasons, the data suggest that while spawning populations have been consistently decreasing in three regions, they have been increasing in the two main west coast of Vancouver Island fishing regions. Such changes in population abundance are probably due, however, to variations in the relative strengths of the contributing year-classes rather than to "overfishing" or "underfishing."



Pacific Herring (Clupea pallasii)

Pacific herring (Clupea pallasii) spawn in shallow water along the shoreline. The majority of eggs are deposited on vegetation, in or just below the intertidal zone, i.e., between the high and low-tide levels. Spawning grounds may vary in size from a few yards to several miles, the length and width being largely determined by the distribution of the vegetation and the stage of the tide at time of spawning. The spawning grounds are not randomly distributed along the coastline but are found in certain preferred regions year after year.

The measurement of the extent and intensity of herring spawnings along the British Columbia coast is carried out annually by officers of the Canadian Department of Fisheries. Members of the Biological Station, Nanaimo, B. C., carried out more detailed spawn surveys in the west coast of Vancouver Island subdistrict from 1946 to 1954 and in the lower and middle east coast of Vancouver Island subdistricts in 1955 and 1956.

The maintenance of an adequate spawning stock in each of the major herring populations is essential to insure the perpetuation of the fishery dependent upon them. Estimates of the amount of spawn deposited in any area form an index of the size of the spawning stock and of the initial size of the new year-class. As spawning begins shortly after the close of the fishery, natural mortality in the intervening period will be negligible, and the estimate of the spawning stock will thus represent the escapement from the fishery.

In 1956, 188.1 statutory miles of spawn were recorded in British Columbia coastal waters, a reduction of about 13 percent from the 1955 level. In only two of the eight subdistricts (the upper east and west coast of Vancouver Island) was there an increase in extent of spawn over the previous year.

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TERRITORIAL SEA LIMIT OF 12 MILES ADVOCATED: The Canadian Government intends to claim the Gulf of St. Lawrence and similar bodies of water on Canada's coasts as Canadian territory, reports the Canadian Globe and Mail of August 17, 1956.

Officials said that international recognition of the claim will be sought at the U. N. General Assembly this fall. The assembly is expected to deal with the thorny problem of the limits of territorial waters.

The Canadian Prime Minister told the Commons on July 30 that the Government feels the present three-mile territorial limit of Canada should be extended to 12 miles offshore.

Authorities said that besides this the Government will claim as Canadian territory the Gulf of St. Lawrence, Hecate Strait between the Queen Charlotte Islands and the British Columbia mainland, and several bays, sounds, and gulfs, in the Arctic archipelago.

Historic fishing rights enjoyed by other countries along Canada's coasts would have to be recognized, the Prime Minister said.

The claim will not involve Hudson Bay or Hudson Strait, long recognized as Canadian territory though the entrance to them--between the northern tip of Labrador and Resolution Island--is about 32 miles wide.

Canada has never officially claimed the Gulf of St. Lawrence as Canadian territory. A 1937 government order-in-council defined the territorial limit in the St. Lawrence Estuary as a line running from Cape Rosiers on the Gaspe Peninsula to the western end of Anticosti Island and then north to the Quebec mainland.

The Prime Minister has indicated that Canada wants the territorial limit to be measured from a line running from headland to headland rather than following the sinuosities of the coast.

If this plan were followed--it was approved by the International Court of Justice in a case involving Norway several years ago--Canada could claim as its territory waters west of a line running from Cape North, N.S., to Cape Bay, Newfoundland. Cabot Strait at this point is 70 miles wide.

Chile

TERRITORIAL WATERS CLAIMS POSITION MAINTAINED: The Chilean Foreign Minister, in a press interview during his stay in Ecuador as chief of the Chilean delegation to the inauguration of Ecuador's new President, made the following statement: "I believe that the three countries (Chile, Ecuador, Peru) must jointly maintain their position in defending the wealth of their seas; to obtain recognition of their sovereignty over the marine wealth and to exploit it, and if others must be permitted to take advantage of that wealth it must be with the authorization of the coastal countries. In this matter the Foreign Offices (of the three countries) are in agreement."

The Chilean Foreign Minister stated that the position of the United States is one of a general character and that the United States is always ready to continue discussing the problem in harmony with the other countries. He also said, "We are always ready to enter discussion on a plane of harmony and cordiality."

Ecuador

CONVERSION REQUIREMENT INCREASED ON SHRIMP EXPORT EARNINGS: The amount of earnings from shrimp exports which Ecuadoran shippers must convert into sucres at the Central Bank's official rate of 15.00 sucres to the United States dollar has been increased by Monetary Board Regulation No. 178, dated August 16, 1956.

Under the new rule, US$300 a metric ton must be converted at the official rate, compared to US$100 in the past. The $100-formula remains in effect for all other fish exports. The regulation is pursuant to an Emergency-Decree Law, promulgated in the Official Register of June 30, 1956, which modified the basic fishing law to permit the Monetary Board to require the conversion of up to the entire amount of earnings from fish exports at the official rate of exchange.

The new regulation will mean a drop in earnings of approximately two U. S. cents a pound for national shrimping companies, most of which are owned by American interests. Since shrimp is currently reportedly selling for around US$1,400 a ton (about 63 U. S. cents a pound), they are still able to retain the bulk of their earnings or to convert them at the broker's free market buying rate (which averaged approximately 18.55 sucres to the dollar during July 1956). However, the companies indicated several weeks previous that any substantial increase in the conversion requirement might put them out of business. The Monetary Board, concerned with the weakness of Ecuador's monetary reserves, and responding to an appeal from the Ministry of Economy's Director of Fisheries, nevertheless has taken a step toward putting the infant fish industry more nearly on a par with other exports, according to the United States Embassy at Quito in an August 22, 1956, report.

Formosa

SHRIMP FISHERIES: Taiwan's shrimp and prawn production for 1955 amounted to 3,211 metric tons compared with 2,027 tons in 1952, 2,473 tons in 1953, and 1,987 tons in 1954. Local production is characterized by small-scale operations conducted by numerous independent producers, according to a United States Embassy report (March 6, 1956) from Taipei.

Approximately 28 percent of the 1955 catch resulted from coastal fishing operations, which involve the use of sail or manpowered sampans which catch shrimp of less than $2\frac{1}{2}$ inches (heads on) in length. Catches from deep-sea and inshore fisheries, which utilize motorized vessels ranging in size from 10-100 tons, accounted for 45 percent of the 1955 catch and consisted primarily of shrimp of about $2\frac{1}{2}$ inches in length. Output of cultured prawns, averaging 5 inches in length, accounted for the remaining 17 percent of the total production. The predominant cultured prawn species are Penaeus japonicus (Bates) and others of the same genus, while most of the shrimp caught consist of edible kinds of the Macrura family.

The most common methods of catching shrimp include the use of set nets, gill nets, beach seines, and seine and swing-bell nets. The height of the shrimp season runs from March through May, though operations are conducted throughout the year. About two-thirds of the total catch is gathered in the warm tropical waters off the southwest coast of the Island.

Production is insufficient to meet local demand and imports of dried shrimp from Japan are resorted to in order to make up the deficiency. There have been no past exports of shrimp and little likelihood exists that this situation will be changed in the future as no abundant shrimp resources are known to exist.

Outside of some sun-drying by fishermen, no processing of shrimp is undertaken nor do facilities for any type of processing exist.

German Federal Republic

SYNTHETIC NET FIBER: Successful experiments have been conducted with a new low-cost synthetic fiber of the polyvinyl-alcohol group to replace cotton in the manufacture of gill nets used to catch herring in the West German lugger fisheries, points out an August 10 report from the United States Consulate at Bremen.

The Department for Nets and Net Materials of the West German Federal Fisheries Research Institute in Hamburg is investigating the suitability of polyvinyl-alcohol fiber (this type of synthetic fiber is reported to be produced on a large scale in Japan where it is marketed under various trade names) in the manufacture of fishing nets. It was found that this fiber when submerged in water loses about 30 percent of the very high tensile strength it has when in the dry state. The Institute by experimentation has managed to eliminate this disadvantage by coating the fiber with a special type of iron-black that is also used to strengthen perlon nets.

This achievement may prove to be of great practical significance since this rot-resistant fiber is reported to cost less than other types of synthetic fiber. In Germany the price of nets made of this synthetic fiber will probably be only slightly higher than those made of cotton.

The Institute is planning a large-scale test with gill nets made of this fiber for use in fishing operations during the 1956 herring season. The development may be of special benefit to the lugger fisheries which specialize in catching herring with stationary gill nets--so far made of cotton. To date the introduction of synthetic fiber nets in this industry has been unsuccessful because of the relatively high cost of the synthetic nets.

German deep-sea vessels use almost entirely trawl nets made of manila. Synthetic fiber nets, made primarily of perlon, a product similar to nylon, are being used only on a relatively small scale aboard trawlers.

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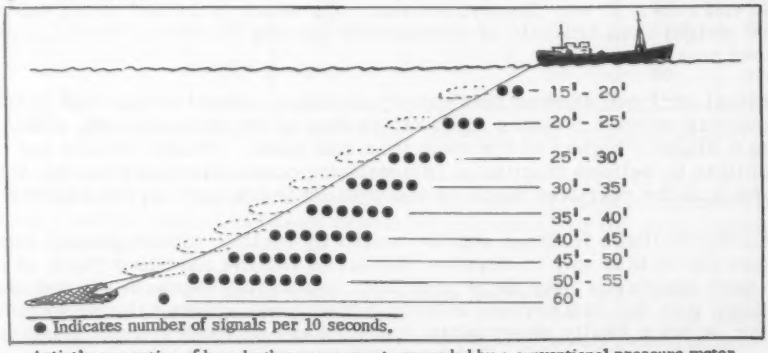
TELECOMMUNICATING DEPTH FINDER FOR MIDWATER TRAWL NETS: A new type of depth finder has been developed in West Germany to determine the movement of midwater trawl nets, points out a United States Consular dispatch (August 10) from Bremen. The device uses sound signals to indicate the depth at which the midwater net moves. Experts claim it to be an improvement over depth finders using frequency modulation.



Artist's conception of how depth measurements recorded by a conventional pressure meter attached to the ground rope of the trawl net are electrically transformed into sound signals and transmitted as such to the fishing vessel.

To make easier the adjustment of midwater trawl nets to the depth at which fish swarms have been located by echo-sounders, the German Federal Fish Research Institute in cooperation with industrial firms has developed a new device which is believed to be suitable in actual fishing operations.

The telecommunicating depth finder developed in West Germany uses the same principle as a somewhat similar United States device. It consists of a conventional pressure meter attached to the ground rope of the trawl net and measuring the

depth position of the net. These measurements are electrically transformed into sound signals and transmitted to the fishing vessel. Instead of employing frequency modulation to indicate the depth of the net, as does the United States device, the German apparatus uses groups of intermittent sound signals for various depths. It was found to be too difficult to produce Morse-code signals for this purpose. The oscillator therefore emits uniform signals of a steady frequency of 15 kc. with a speed of about three signals a second. Every period of 10 seconds from 1 to 10 signals are emitted to indicate the depth measured by the pressure meter attached to the trawl net. For example 2 signals per 10 seconds may indicate that the net is moving at a depth of about 15 to 20 feet, 3 signals at 20 to 25 feet, 4 signals at 25 to 30 feet, etc. When a depth of 60 feet has been reached, the series of signals start again with one per ten seconds. No difficulties were experienced in repeating the series of signals because the depth at which the trawl net moves can easily be determined within a tolerance of 60 feet.

The use of intermittent signals rather than frequency modulation seems to have definite advantages. The signals fortunately are for all practical purposes not affected by disturbances caused by the ship's propellor. This difficulty was reported to be one of the main obstacles in the development of the frequency-modulation method for commercial use. Recent tests conducted with the new device on board the research vessel Anton Dohrn showed an excellent reception of signals emitted from a trawl net towed with 375 fathoms of line at a depth of 450 feet.

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TRYPTOPHANE CONTENT OF FISH-MEAL PROTEIN BETTER INDICATOR OF NUTRITIVE VALUE: West German food scientists find that the tryptophane content of fish-meal protein may be a better indicator of the fish-meal's nutritive value than just the amount of protein itself, states a United States consular dispatch dated August 10 from Bremen.

In order to determine the nutritive value of dried shrimp, the Federal Research Institute for Fish Processing in Hamburg conducted a series of experiments with protein-starved rats. It was discovered that rats which were fed dried shrimp gained more weight than animals of comparable groups receiving identical quantities of fish or cod meal.

A chemical analysis showed that the tryptophane content of the raw protein in dried shrimp was about 1.5 times as great as that of the fish and cod, with fish meal having a slightly higher percentage than cod meal. These results led the Institute scientists to believe that there is a definite connection between the tryptophane content and the nutritive value of the protein feeds used in the experiments.

The validity of these findings will be tested by further investigations since it might be possible in this way to develop standards for the nutritive value of protein feed. Such standards may be of practical importance because recent experience has shown that the raw protein content hitherto considered the determining quality factor is not a really dependable standard to establish the nutritive value of fish meal.

Haiti

CANNED SARDINE MARKET: Imports of canned sardines into Haiti are estimated to vary between 157,000 and 187,000 pounds a year and represent the total consumption since there is no domestic production. The trade in canned sardines is very small but fairly well stabilized, states a June 27, 1956, dispatch from the United States Embassy in Port-au-Prince.

Consumption of all packaged foods, including sardines, is low in Haiti due to the low per-capita income which is estimated to average only US$60-70 yearly. The low-income group, which forms at least 80 percent of the population, can rarely afford packaged food of any kind.

Imports of sardines and similar fish (with or without oil) during the year October 1954-September 1955 totaled 157,000 pounds valued at US$32,590. Canada was the leading supplier with 108,770 pounds (value US$21,483); followed by Holland with 24,215 pounds (value US$3,813); France 12,914 pounds (value US$5,031); and the United States with only 5,319 pounds (value US$636). The balance of 5,781 pounds valued at US$1,628 came in small quantities from six other countries.

Other canned fishery products imports are included in a basket category which comprises cod, herring, haddock, mackerel, tuna, with or without sauce or oil, and salmon in sauce or in oil. Imports of this basket category during the same year totaled 7,100 pounds of which 2,500 pounds came from the United States.

About 80 percent of the canned sardines sold are 3¼- to 5-oz. flat cans, and the balance are packed in 1-lb. tall and oval cans and 8-oz. oval and tall cans. Of the sardines sold, 40 percent are in olive oil, 40 percent in vegetable oil, 12 percent in tomato sauce, and the balance brine, natural, and mustard sauce.

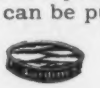
Table 1 - Retail Prices of Canned Sardines in Haiti in Mid-1956

Size of Can	Olive Oil	Vegetable Oil	Mustard	Tomato	Natural	Brine
	.....		(U. S. ¢ a can)		.....	
3¼ to 5 oz.....	25	12	10	10	10	10
8 oz. tall	50	30	-	30	30	30
1 lb. tall	-	-	-	40	40	40
8 oz. oval	50	30	-	30	30	30
1 lb. oval	-	-	-	40	40	40

Consumption of sardines is confined to the high (40 percent) and the middle (80 percent) income groups with consumer preference (probably influenced by price) about equally divided between vegetable oil and olive oil as a packing medium.

The retail price of the 3¼ to 5-oz. sardines packed in vegetable oil is 12 U. S. cents; tomato sauce and brine 10 cents, and in olive oil 25 cents (see table 1). Small quantities of high-quality sardines of Portuguese and French origin enter Haiti as luxury items and retail for 50-60 U. S. cents for the 4- to 5-oz. flats.

All imports of sardines enter Haiti through regular commercial channels and any increase in the imports from the United States would be contingent on the ability of United States suppliers to meet the price competition from other importing countries, particularly Canada. The Haitian market is more influenced by price than quality, packing, or other factors and it is unlikely that this trade pattern will change in the near future. Due to the low per-capita income, the largest volume of imported fish is bulk salt cod, which can be purchased at retail in small quantities at relatively low prices.



Hong Kong

NEW NET FACTORIES: An interesting development for Hong Kong's fishing industry recently took place with the installation in one factory of several machines for the automatic weaving of fishing nets. Approximately 80 people are employed on this work and production is expected to vary from 12,000 pounds of cotton fishing nets a month up to a maximum output of 36,000 pounds. Approximately 14,000-40,000 pounds of cotton yarn are used monthly and the nets woven on these machines reportedly are much in demand, locally and for export.

Another recently-established factory has now come into full production; it is a weaving mill, employing about 30 workers for the production of net cloth (about 100,000 yards monthly) and bags for use as vegetable containers (September 27, 1956 dispatch from United States consulate in Hong Kong).

Iceland

EXPORTS OF FROZEN FISH TO U. S. INCREASE: For the first time in two years Icelandic exports of frozen fish to the United States are definitely on the increase. Shipments through September 31, 1956, were expected to reach about 12,072 metric tons in comparison with 9,153 metric tons for the same period last year. Total exports for all of 1955 amounted to 10,888.

It is not certain that shipments will hold up at an equal pace through the balance of this year, but it seems safe to conclude that total Icelandic earnings from fish exports to the United States will be considerably higher this year than last and may approach the high level of 1954 (over 19,000 tons).

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HERRING CATCH ON SOUTH COAST HIGHER IN 1956: Although daily catches of herring on the South Coast of Iceland have been only fair, the total as of September 1, 1956, was expected to exceed that for the similar date in 1955 by about 82 percent. The increase was reported to be due to an earlier start this year than last. The total catch to midnight September 1 was 10,645 metric tons as compared with 5,840 tons as of the same date in 1955. The catch as reported by the Iceland Fisheries Association is as follows:

Destined for:	1956	1955
Salted	4,498	1,952
Reduction	1,096	-
Freezing	5,051	3,888
Total	10,645	5,840

A new contract has been signed with the Soviet Union for an additional 25,000 bbls. of salted South Coast herring. This leaves a total of 85,000 bbls. under order, 75,000 for the Soviet and 10,000 for Poland.

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NEW TRADE AGREEMENT WITH RUSSIA INCLUDES FISHERY PRODUCTS: As a result of trade negotiations held between September 17-27, 1956, the Iceland Minister of Foreign Affairs and the Soviet Director of the Ministry of Foreign Trade signed a new trade agreement on September 27 that will be effective for the calendar years 1957, 1958, and 1959. The new trade agreement proposes Icelandic exports of fishery products to Soviet Russia as follows (quantities in 1956 agreement

shown in parentheses): frozen fish fillets 32,000 metric tons (20,000); salted herring 15,000 tons (15,000); frozen herring 1,000 tons (none); and unclassified commodities to the value of 2 million Iceland kroner or US$123,000 (unchanged from 1956).

The 1956 Trade Agreement was amended recently to include an additional 8,000 metric tons of frozen fillets to be delivered by Iceland to Soviet Russia this year, making a total of 28,000 tons in 1956, points out a September 28, 1956, dispatch from the United States Embassy at Reykjavik.

India

CONFERENCE DISCUSSES DEVELOPMENT OF FISHERIES: An all-India Fisheries Conference was scheduled at Madras from September 19-22. The conference was to discuss important problems relating to planned development of fisheries in India under the Second Five Year Plan. The subjects listed for discussion at the conference included ways and means of increasing fisheries production, establishment of fishing harbors, development of fishing craft industry, preservation and utilization of fish and fishery products, and transport facilities for the industry. (United States Embassy, New Delhi, report dated September 20, 1956.)

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SECOND FIVE-YEAR PLAN INCLUDES COMMERCIAL FISHERIES DEVELOPMENT: Development plans now under consideration envisage a 50-percent increase in India's fish catch in the next ten years. Every year the fisheries contribute about Rs. 270,000,000 (US$56.6 million) to the country's national income, engage about 75,000 craft of various types along a coastline of about 3,000 miles, and give employment to some 750,000 fishermen.

Technological improvement and research form a vital part of the Rs. 120,000,000 (about US$ 25.2 million) scheme for fisheries included in the second Five-Year Plan of India, states The Fishing News, August 10, 1956.

At the beginning of the first Five-Year Plan, India caught about 1,000,000 metric tons of fish a year.

Improvements effected in the means of catching fish during the first Plan period increased the yield by about 10 percent and in 1955/56 it was estimated at 1,000,000 tons. During the second Plan period the catch is expected to increase by about 33 percent, i. e. 1,400,000 tons.

India's inland and marine fisheries made appreciable headway during the first Plan period. With a Plan provision of Rs. 50,000,000 (US$10.5 million), improvements were noticed in many fields--in the method of fishing, bringing under the fish culture large bodies of water currently lying fallow; introduction of new methods of scientific fish farming; and better forms of storage, transport, and marketing.

Added to these were the application of extension methods to meet the practical needs of the industry.

The importance of fisheries to India's economy and the need for its systematic development were emphasized by the Deputy Minister of Food.

The Deputy Minister is shortly leaving on a tour of China. He said that during his stay there he would study the development of fisheries. On his way back he has planned to visit Thailand and Burma.

The Deputy Minister of Food said that there was a great scope for the development of fisheries in India. The Government of India had already made a beginning in that direction by taking up deep-sea fishing and charting fishing grounds.

The program would be stepped up in the coming years. The plan provides for the development of inland and marine fisheries to supplement the food needs of the country, which has a low per capita land holding.

According to India's fisheries development scheme under the second Plan, Malabat in South India would get an allotment of Rs.367,000 (US$76,939) for the year ending March 31, 1957.

The development of fisheries will consist of equipping modern fishing boats, providing nylon nets and bait arrangements to transport fresh fish to interior areas, starting of small-size ice plants in fishing centers, and giving subsidies to cooperative societies of fishermen.

The Government of India has sanctioned a sum of Rs.4,300,000 (US$901,468), the largest grant for any district for the development of the fishing industry in Tanjore District, South India, during the second Plan period.

A detailed programme has been drawn up for the development of coastal and inland fishing in the district which has a coastline of 160 miles. The scheme aims at mechanizing fishing craft, providing facilities for storage, etc., and training fishermen.

A Fishermen's Training Centre at Brankulam, South India, to impart academic and practical instruction in fishing has been started.

Under the second Plan, the State authorities had made considerable provision to improve the standard of living of fishermen and their method of fishing. The Training Centre was part of the many schemes now being implemented in the State.

The third of its kind to be opened in India under the joint program of the Government of India and Food and Agriculture Organization, the Centre aims at increasing fish production and improving the standard of living of fishermen.

Under the scheme, a batch of 20 fishermen selected from different areas of Travencare, Cochin, and Nalabar, and South Kanara districts will receive training for six months on principles of navigation and seamanship. They will also be helped in the use of mechanized fishing boats and fishing tackle for deep-sea fishing operations.

There are about 22,000 persons along the sea coast of Travancore-Cochin engaged in fishing. It is proposed to manufacture and issue mechanized boats to fishermen at concession rates.

The Travancore-Cochin Government has also accorded administrative sanction for the construction of a breakwater to provide landing facilities for over 3,000 fishing boats, particularly during the rough season at Vishinjam, nine miles south of Trivandrum, at a cost of Rs. 2,100,000 (US$440,252).

Preliminary investigations and a survey for the breakwater scheme will be done during the current year and the actual construction work will start next year.

The State Government has requested the Government of India to lend the services of two Swedish harbor experts who are now in India on an FAO assignment to conduct an investigation.

A boat-building yard is to be established at the fishing bay for the construction of mechanized boats for the fishermen.

A demonstration of mechanized deep-sea fishing operations was given off Mangalore, South India, to a party of officials and nonofficials. Mechanized fishing was started here under the guidance of an FAO fisheries expert.

This boat is now being operated by local fishermen on a lease basis with good results. The Fisheries Department is also conducting deep-sea fishing operations with the help of another power-driven trawler received under the auspices of the Technical Cooperation Mission to the Madras Government.

A few more trawlers of the Danish type will be allotted for leasing out to local fishermen by the Madras Government.

A scheme to give technical and financial assistance to fishermen's cooperatives and fishermen's associations has been drawn up by the Uttar Pradesh Government for improving the fishery resources and giving an impetus to fishermen in that State.

A total nonrecurring expenditure of Rs. 1,140,000 (US$239,000) is envisaged during the second Five-Year Plan period and a sum of Rs. 50,000 (US$10,482) has been earmarked for the purpose during the current financial year.

During the first year of the Plan, five parties of fishermen's cooperatives or fishermen's associations will be given aid to the tune of Rs. 10,000 (US$2,100) per party.

During the second, third, and fourth years of the Plan, financial help will be given to 20, 25, 30 and 40 fishermen cooperatives or associations, respectively. The Government of India is expected to share the cost of the scheme on a fifty-fifty basis.

Israel

SHRIMP FISHERY: The demand for shrimp is light in Israel because of religious dietary laws. However, Israel is attempting to develop the production of shrimp for the limited domestic market and the export market, a September 13 dispatch from the United States Embassy in Tel Aviv states.

A technician in the United States Operations Mission who has been working with the Israel fish industry, stated that the production of shrimp is still largely experimental and that no accurate figures are available regarding the annual production of shrimp. It is known, however, that the present volume is very small and this supply is sold through a few nonkosher restaurants and other outlets. The technician mentioned that it is hoped that within the next year the total production of shrimp will be increased to about 100 metric tons a year. If the production is increased to 100 metric tons, it is expected that 20 tons will be used for local consumption and 80 tons will be available for export.

Italy

FINANCIAL ASSISTANCE TO FISHING INDUSTRIES PROPOSED: When the Italian Senate reconvenes, it will examine a bill, presented by the Minestry of Merchant Marine, authorizing extraordinary expenditures from the budget for fiscal 1956/57 for a 300-million lire (US$480,000) program for the development of fishing activities. In particular grants will be made for the construction of new fishing boats in national yards to replace existing obsolete vessels of less than ten tons and with motors of less than 45 hp.

Grants may also be made for the repair and improvement of boats for the transportation of fish, to set up installations for processing fish and warehouses for the storage of fishing provisions, and for the construction of workshops to repair fishing equipment.

Further contributions may be granted for the construction of fishing markets and for the renewal of fishing equipment, including nets, cords, cables, refrigerators, etc.; for the development of installations to produce ice; for the installation of two-way radios; for the operation of homes for the children of fishermen; and for conducting surveys of potential new fishing grounds.

Finally, the subsidies may be granted to Italian companies to construct fishing vessels, which will use exclusively Italian crews, providing such boats weigh not less than 1,000 tons and that they operate on the high seas at long distances from the Italian coast at least six months during each year.

Note: Values in US$ based on rate of 1 lire equals US$ 0.0016.

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MARKET FOR MARINE-ANIMAL OILS: The Italian market for oils derived from fish and marine mammals is insignificant as compared to that for oils derived from vegetable sources. Production of marine animal oils in Italy is negligible and imports, principally for edible purposes, amounted to only 8,423 metric tons in 1954 and 7,889 tons in 1955. The annual consumption of edible vegetable oils is estimated at about 400,000 metric tons, according to a survey made by the Foreign Agriculture Service of the United States Department of Agriculture.

The imports of marine-animal oils for 1955 consisted of 1,292 tons of cod-liver oil (over half of which came from Norway) and 6,597 tons of other marine-animal oils (Norway supplied 48 percent of the total, followed by Australia with 20 percent). No imports were listed as coming from the United States. Only 11 tons of marine oils were exported in 1955 by Italy.

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PARTICIPATES IN GENERAL FISHERIES COUNCIL FOR THE MEDITERRANEAN: The Italian Ministries of Agriculture and Merchant Marine, responsible respectively for inland and coastal fishing matters, participated in the September 17-23, 1956, meeting at Istanbul of the General Fisheries Council for the Mediterranean. (Other participants were Turkey, France, Spain, Egypt, Greece, Yugoslavia, Israel, Tunisia, and Monaco.

The Italian Government has indicated its deep interest in this meeting since it is hoped that it will provide the means of bringing its industrial and commercial fishing installations more up to date through the application of modern techniques. (August 31, 1956, dispatch from United States Embassy in Rome.)

Note: Also see Commercial Fisheries Review, October 1956, p. 45.

Japan

ANTARCTIC WHALING FLEETS FOR 1956/57 SEASON INCREASED: The Japanese whaling fleets that leave Japan early in November for the Antarctic 1956/57 whaling season will consist of five factoryships and 54 catcher boats. Included is the Olympic Challenger fleet (a factoryship and 15 catcher boats) that was purchased in the spring of 1956 from a Greek shipping firm for US$8.5 million. The fleets for the 1955/56 season consisted of three factoryships and 40 catcher boats.

It is estimated that when the season ends in the early part of 1957 that the catch will be 30 percent greater than the 6,462 actual whales caught in the 1955/56 Antarctic whaling season (69,505 metric tons of oil reported in 1955/56). The additions to the fleet of whalers will make the Japanese fleet second to that of the Norwegians.

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BRAZIL INVITES RESEARCH SHIP TO SURVEY FISHERY RESOURCES: In response to an invitation from the Brazilian Government, the Japanese will dispatch the Toko Maru of 1,100 gross tons to survey undeveloped fishing grounds in the South Atlantic. This project was originally planned to be made in cooperation with the Argentine Government, but plans failed to materialize. The survey ship is one of the most advanced type with modern equipment and facilities and carries a 40-man crew and 8 scientists. The ship will engage mainly in trawling and if successful the Japanese Fisheries Agency hopes to form a joint Brazilian-Japanese fishing company.

The Toko Maru is scheduled to leave Japan about the end of October on a 6-10 months round-the-world survey trip. The first part of the trip will take the vessel through the Indian Ocean to Brazil for the planned survey. During the approximately 6 months' stay in Brazilian waters, the ship will operate from bases in Rio Grande, Rio de Janeiro, and Belem and report findings to the Brazilian Government. She will then proceed to the Dominican Republic and Mexico to investigate overseas fishing ventures with these countries, states a September 7 dispatch from the United States Embassy in Tokyo.

Note: Also see Commercial Fisheries Review, March 1956, p. 42.

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CANNED SARDINE PACK FOR 1955: The Japanese pack of canned sardines for the calendar year 1955 amounted to 899,122 actual cases, according to a September 25, 1956, dispatch from the United States Embassy in Tokyo. Although sardines

Table 1 - Japanese Canned Sardine Pack by Can Size and Style of Pack, 1955

Style Pack	Size of Can								Total	Percentage of Total
	3-4 oz.	4-5 oz.	5-6 oz.	8 oz.	12-13 oz.	24 oz.	54 oz.	Other		
	(Number of Cases)									%
Boiled	2,035	54,536	-	-	-	6,103	-	113	62,787	7.0
In oil	5,125	-	-	-	-	-	-	1,215	6,340	0.7
Tomato sauce	-	35,064	165,383	3,677	264,415	-	-	226	468,765	52.1
Brine (seasoned)	9,309	-	273,539	-	69,628	-	2,374	2,205	357,055	39.7
Broiled	3,375	-	-	-	-	-	-	-	3,375	0.4
Unclassified	-	-	-	-	-	-	-	800	800	0.1
Total	19,844	89,600	438,922	3,677	334,043	6,103	2,374	4,559	899,122	100.0
Percentage of Total %	2.2	10.0	48.8	0.4	37.2	0.7	0.3	0.5	100.0	

Table 2 - Japanese Canned Sardine Pack by Case Size and Style of Pack, 1955

Style Pack	Number of Cans to Case						Total
	6	24	48	96	100	Other	
Boiled	-	6,103	-	2,035	54,536	113	62,787
In oil	-	-	1,450	-	3,675	1,215	6,340
Tomato sauce	-	32,725	297,944	137,870	-	226	468,765
Brine (seasoned)	2,374	3,021	207,066	142,389	-	2,205	357,055
Broiled	-	-	-	-	3,375	-	3,375
Unclassified	-	-	-	-	-	800	800
Total	2,374	41,849	506,460	282,294	61,586	4,559	899,122
Percentage of Total %	0.3	4.7	56.3	31.4	6.8	0.5	100.0

were packed in five or more different styles, sardines in tomato sauce (52.1 percent) and in brine (39.7 percent) were the principal packing mediums. The number of cans to the case varied mostly from 24 to 100, but cases with 48 cans to the case and 96 cans to the case accounted for 87.7 percent of the total pack. The pack in terms of ounces to the can (original data in grams, calculated to nearest ounce equivalent) varied between 3 and 54 ounces, but packs of 5- to 6-ounce (48.8 percent) and 12- to 13-ounce cans (37.2 percent) were the principal sizes packed.

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CRAB CANNING INDUSTRY OF HOKKAIDO ISLAND: Three different crab canning plants in Northeast Hokkaido were visited the latter part of June 1956 by members of the United States Embassy at Tokyo, and this is a report on their observations:

In every case the installations were very simple and inexpensive, consisting of boiling pits, cooling pits, work tables, can-sealing machines, and sterilizers. The plants all had about the same annual canning capacity, 85,000-90,000 cases of 48 cans of 6½-oz. each. The total cost of the equipment probably did not exceed US$75,000-100,000 in any of the plants exclusive of fishing vessels.

Hairy crab (kegani crab) is canned chiefly in shore canneries; the king crab is canned on ships in the area of catch. Some king crab, however, are caught in the traps which are placed at 20 to 30 miles offshore. Cannery officials said that the large number of king crabs caught this season in traps set for hairy crab at latitudes considerably to the south of the king crab's normal habitat indicates that the stock of king crab in the North Pacific and the Okhotsk Sea is large and that the pelagic catch this year should be good.

Nevertheless, out of a total Japanese crab catch by land-based operations in 1955 of 152.1 million pounds, only 26.5 million pounds were king crab, the remainder, hairy crab. The king crab catch in the area around Habomai and Kunashiri Islands, now held by the Russians, was once very important, but has declined in importance to Japan because crab boats are fearful of being seized, as many have, by the Russians. King crab catches in the Kuriles in 1956 were only 10 percent of the 1955 catches.

For the most part, cannery owners purchase crab from independently-owned crab boats, although a few canneries operate their own crab fleets. The price of crab in Hokkaido is set before the season begins by the boat owners. This year's price, ¥15,000 (US$41.70) a metric ton, was the same as last year's.

It would appear on the basis of information gathered that the crab canning industry in Hokkaido operates on a fairly high profit margin with a minimum of investment. For example, with everything operating smoothly, one of the small plants visited could produce 200 cases of 48 6½-oz. cans in one 8-hour shift. Production costs for an 8-hour day for this amount, based on information gathered, would be approximately as follows:

	¥	US$
Crab 1/ - 8.8 tons @ ¥15,000 (US$41.70)	132,000	367
Labor 2/ - 200 workers @ daily rate of ¥400 (US$1.10)	80,000	221
Operating costs, fuel, electricity, etc.	20,000	56
Depreciation on investment 3/	45,000	125
Materials costs	40,000	111
Managerial wages (2 @ Y5,000)	10,000	28
Total	327,000	908

1/ 200 cases contain 3,872 lbs. of crab meat. Approximately 20 percent of the crab is recoverable meat. Thus the weight of live crab for 200 cases is 3,872 times 5, or 8.8 metric tons (19,360 lbs.).

2/ There were two hundred employees at this plant, 75 percent of which were female. The rate for female labor in the cannery was ¥200 (55 U.S. cents) per shift, plus food and lodging.

3/ Total investment in the plant is estimated at ¥27 million (US$75,000), amortized over a 10-year period, i. e. ¥2.7 million (US$7,500) per year. But the work period is only about 60 days, thus the depreciation rate is ¥45,000 (US$125) per working day.

The total cost to produce 200 cases of canned crab meat is approximately ¥330,000 (US$917). The f.o.b. Yokohama price of hairy crab per case of 48 6½-oz. cans is US$12.50 or ¥4,500. Total receipts from 200 cases would be ¥900,000 (US$2,500). This would mean a profit for the cannery of ¥560,000 ($1,556) for one day's operation.

It is possible that some of the cost items were underestimated, but the two principle ones, cost of live crab and labor, are accurate. However, it is understood that selling and transportation costs in Japan are high.

The question of perpetuating the stock of hairy crab is one which is of concern to the industry although little is being done about it. The only conservation measures on crab are the limits on the season and the number of boats, which are controlled through a licensing system. But some observers fear that the stock is diminishing although this opinion is not based on a thorough scientific study because none has been made. The problem of controlling fishing activities in Japan is a very difficult one. Many factors account for this: (1) the Japanese are aggressive and efficient fishermen; (2) there are hundreds of small fishing boats independently-owned in Japan and there are pressures ever present to utilize the equipment and realize a return on it; (3) employment (or unemployment) is an ever-present problem--there are people always ready to share the risk of unauthorized fishing; (4) the coast line is long, making patroling difficult.

The crab industry on the Eastern tip of Hokkaido, facing the island of Kunashiri, was reported to have had a very poor season this year, chiefly because crab boats were fearful of venturing into the area over which the Russians have jurisdiction. The March 23, 1956, announcement by the Russians restricting salmon fishing and the seizure of a Japanese fishing boat coincide with the opening of the crab season, and even though the Russian restrictions for 1956 did not include crab, many boat owners were wary of going into the restricted area. It was reported that crab canners in the Eastern area of Hokkaido feel that the industry might be facing a difficult period because of the Russian attitude and some are converting their equipment so that it can be used for vegetable canning.

The 1955 crab pack (both land-based and high-seas) was approximately 690,000 cases (48 6½-oz. cans) of which 480,000 cases were canned in Hokkaido canneries (kegani crab) and 210,000 on cannery ships (king crab).

Owing to bad weather in the early part of the 1956 season (April and May), the catch was poor and there is some doubt that the kegani crab target of 300,000 cases can be reached. Some observers believe that the total kegani crab pack will not exceed 200,000 cases.

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THE CRISIS IN THE TUNA INDUSTRY: A panel discussion held at Misaki, Japan, on August 23, 1956, considered the problems which might be taken up by the Tuna Fishery Investigative Committee recently established by the Japanese Fisheries Agency. The following report on the discussion appeared in the Suisan Shuho (September 5, 1956), a fishing industry weekly:

Participants: M. Teramoto, Member of the Tuna Fishery Investigative Committee, President of the Kanagawa Prefecture Tuna Fishermen's Association; S. Sugano, President of the Kanagawa Prefecture Tuna Society; K. Mito, Secretary of the Kanagawa Prefecture Tuna Society; N. Hayashi, Managing director of the Kanagawa Prefecture Tuna Fishermen's Association; M. Kojima, Owner of the Daikoku Maru; W. Mabune, Assistant Manager of the Misaki office of Taiyo Gyogyo Co.; T. Okamoto, Official of the Kanagawa Prefecture Tuna Society.

Tuna Resource Problems: Moderator: The Establishment of the Tuna Fishery Investigative Committee as a consultative body for the Minister of Agriculture and Forestry means, I think, that the tuna fishing industry has at present come to a period when changes must be made. We would like, therefore, to have all of you here at this tuna fishing center of Misaki talk freely about the present situation in the industry and about what you hope for from the Investigative Committee, after which I hope that we will be able to draw some conclusions as to what the Committee should do. Will you speak first, Mr. Sugano?

Sugano: Well, it is my personal opinion that the tunas represent the largest resource among all fishes, followed probably by the salmon and the bottom fishes. Their range of occurrence stretches from 40° on the north to 30° or 40° on the south, with its center on the equator, and up to the present the fishing fleet has been operating freely with the center of its efforts likewise placed in the equatorial region. Thus the resource is extremely large, and I think that we have come to a period when we must consider whether or not we are actually utilizing it to the full. Therefore, first of all we must find out how large the resource is. We cannot go forward into an era of free competition unless we build ships and put them into productive operation. And for that we need a reasonable price for fish. Assuming that there is a limit to the resource, we will have to study the question of whether to restrict the catch by regulation or to get reasonable prices by improving our product. I would like to have the government take up these points.

I hope that Mr. Teramoto will inform the government that we would like to have these points studied, or that we are studying them, and that they will take thought for the future prosperity of the tuna fishing industry. Furthermore, since the fishing grounds are so extensive, there may be friction with foreign countries, and I think that we must take into consideration working together with other countries in the future to conserve and build up the resource.

Hayashi: I have little to add to what Mr. Sugano has said, but I too am most hopeful for action on the problems of the resource. I am a businessman and am not directly concerned with technical or scientific matters, but in the old days, when I first got involved in the tuna business, the small boats used to put out from Misaki and return in 3 or 4 days. And that was not so very long ago. Now the ships are being built larger and larger and the fishing grounds are becoming more distant. This trend has been particularly conspicuous since the war. After the MacArthur Line was done away with, the fishing grounds expanded suddenly, and at that time big catches were made in a few days of fishing on the new grounds, but after a little time had passed the catch per day gradually declined and the number of days of operation increased. In the old days it was said that the resource was inexhaustible, but I feel, as a layman, that this was a mistake. I particularly hope that the Committee will study this point.

New Fishing Grounds: Kojima: Well, I have been going to sea for over 20 years, and back in the period from 1929 or 1930 to 1937-38, when the southern fishing grounds were being opened up, we fished with boats of 30 to 100 tons. Around 1937 this development came to a standstill, but thereafter good catches were made in the Mandated Islands area and they continued until 1940-41. At that time catches ran around 1,000 kan (8,300 pounds) a day. In the same Trust Territory area at present, using 100- to 150-ton boats, the catches have decreased to about half that, or 400 to 500 kan (3,300-4,100 pounds). As Mr. Sugano has said, the range of the tuna is from 44°-45° north to 30°-35° south, but it can be broadly divided into three grounds--the Indian Ocean, the Pacific, and the Atlantic. Two of these--the Indian Ocean and the Pacific--are being fished at present, and on these two grounds the catch rates are dropping year by year. I don't know whether the resource is still there or not, but there is no mistaking the fact that the catch rates are dropping, and if the producers do not take that into consideration, it is clear that the development of the business will be stymied.

Mabune: I, too, as one directly concerned in the fishery, am most worried about the problem of the resource, as mentioned by Mr. Hayashi. The Taiyo Company has operated 13 mothership expeditions, usually on fishing grounds in the Fiji area. Formerly catches were 1,000 to 2,000 kan (8,300-16,500 pounds) per day, but last year they declined to 500 to 700 (3,300-5,800 pounds) and the expedition had a hard time. If this condition continues, it will be difficult to plan operations. I also hope that the Committee will take up the investigation of new fishing grounds.

Mito: I hope for a great deal from the Investigative Committee. From the production angle, it is a fact, as you have all said, that there has been some thinning out of the resource. The scientists may be right in saying that the fish aren't disappearing, but it seems to be a fact that they aren't being caught. We have no clear basis for saying what is happening to the resource. On this point, I hope for studies that will make clear the life of the tuna. I think that if this is not done, it will be hard to find fundamental solutions for the problem of marketing and the other problems which are based on the biology of the tuna.

The marketing field at present is handled by a branch of the Fisheries Agency, but I wonder whether policies can be set up adequately in this way and I would like to have the Investigative Committee take part in basic talks on this problem. I would also like to see them extend their interests to business management. If they get into management problems, there is a danger of their also getting involved in financing problems, but I would like to see them work out some basic lines on such questions as what type of management to use with what type of vessel. At any rate, I hope that they will set up a basis as suggested above.

Clarify Thoroughly the Increases and Decreases in the Tuna: Moderator: We have heard various opinions, but Mr. Teramoto, what do you, as a member of the Investigative Committee think?

Teramoto: If you ask me what I think as a member of the Committee, I think that the most important point is the resource from the point of view of the production field, and I think that we must investigate it thoroughly at this time. Bigger vessels have been coming off the ways since 1951 and the tuna have been fished farther and farther out from the bases, until at present, as you know, there is no part of the Pacific where they don't fish, and the fishery has also developed into the Indian Ocean and even to Madagascar and the Arabian Sea. As for conditions on those grounds, at first catches ran 5,000-6,000 kan (41,000-49,600 pounds) per day, whereas at present they will go 3,000 kan (24,800 pounds) at best and average around 1,000 kan (8,300 pounds). That is in the Indian Ocean, but when we come to look at the Pacific, we can say that the grounds are already fished down, with daily catches of 500-1,000 kan (3,300-8,300 pounds) regarded as highly successful.

We think, therefore, that the resource problem has got to be investigated from various angles. To put it briefly, we can say that 4 or 5 years' statistics show a gradual decline. There are those who, from academic theories or hypotheses, say that the fish are not decreasing but may be increasing, however, this is a knotty problem. I think that we, as a committee, must come up with some solution.

In brief, the decline of the catch is a fact. It is not easy to show this clearly, but I hope that even if it takes considerable time we will be able to get a thorough solution of the problem of the resource. One school of thought is that it is actually declining gradually. However, one tuna spawns tens of thousands of eggs; how many of these survive and grow is a question which we must ask the scientists to study, for at present the growth rate is not clearly known. Until this is known, the problem, I think, cannot be solved. There are probably several methods, but thinking about it as a layman, I wonder if it might not be possible to find the spawning ground, capture some of the young fish, and rear them to study the growth rate. I hope that the scientists will do some basic work on this point.

Make More Use of Tagging Experiments: Sugano: Still talking about the resource problem, I think that there are various species of fish which are not decreasing in numbers, but it is a fact that the tuna are declining. It is a question, however, whether they are among the species which can be completely fished out or whether they will just decrease down to a certain limit and then continue at that level.

For instance, I think that the following can probably be said. In the Indian Ocean daily catches of 4,000 to 5,000 kan (33,100-41,300 pounds) were the usual thing, but now if 2,000 kan (16,500 pounds) is taken it is top fishing. However, when catches of 5,000 kan (41,300 pounds) were being made it was a yet unknown ground and Japanese boats were fishing there for the first time, so naturally the fish took to the bait well. That's why they could catch 5,000 kan. Then when they went there subsequently the catches dropped to 2,000 kan. It might be that the fish have become more knowing, and I wonder whether we can say right off that the resource has diminished. I'm afraid that we may hear the argument that if the resource has declined we had better not go fishing there. If we can't operate on the 5,000-kan level, then it becomes our duty to try to operate on 2,000 kan, and I think that we need to carry on our business with this idea in mind. There is need for persistent investigation of the scope of occurrence of the tuna, and for this purpose good use should probably be made of tagging. We of the Tuna Investigation Society have been tagging tuna, under the direction of the Kanagawa Prefectural Laboratory, by tying vinyl tags on their tails. However, with this method the fish die, and we must find a simpler method which will keep the fish alive so that we can investigate their migrations, spawning, and so forth under natural conditions, and perhaps, if it is necessary, we might even set aside a certain area as a preserve in order to protect the resource. I certainly don't want things to reach the point where we will be told that we must not catch the fish because they are decreasing in numbers.

Regulation Must Come: Teramoto: I sympathize with the views that have just been expressed, but I hardly think that the vessels in operation at the present time will be told to cease because the resource is declining. However, I do think that it may be a poor idea to increase the fleet above the present level. Therefore I believe that some degree of regulation is unavoidable. The problem, of course, is in the method . . .

We have to study beforehand how far the resource has declined; it isn't enough just to squawk about the decline. What we are worried about is the business operations based on that resource--and I think that there is a need to study to find out how long the present state of affairs can last and whether really stabilized operations are possible. I believe that the Committee must, in cooperation with the industry, work hard and from every possible angle on the resource, the management of the industry, and marketing in order to lay out a course and attain its first objectives.

Guidance and Direction are Prerequisites: Moderator: What is the business situation among the tuna boat operators?

Teramoto: Business conditions are difficult. An outsider might think that because boats have become bigger, the business has also become bigger, but the boats have become bigger because it has become more difficult to catch fish and the operators are plunging ahead in competition with one another. That is why the boats are being built larger. The question is whether or not we can continue in business indefinitely with things going along as at present. The government has got to think up some thorough-going measures to keep our business going, because if it is left to go along the way it is now, we will go broke. I think that various regulatory policies could be devised, but the first thing to consider is the "guidance vessels," the government-owned ships. These vessels don't pay any taxes nor do they have any trouble raising capital. Some of the privately-owned boats, meanwhile, are operating on borrowed money. Although the resource is drying up and fish are getting hard to catch, the price of fish doesn't go up at all, and that is why our business is in

trouble. When we consider what to do about it, well, it looks as if we have to cut down the number of boats. However, for the privately-owned boats operating at present, this is their life and their vocation, and they must keep at it until they drop. The government has got to do everything it can to protect them and foster them. One of the ways in which they can be helped that naturally comes up for discussion is the control of the research ships.

Hayashi: These "guidance vessels" are really a problem, aren't they? There are probably about 90 of these government ships in all. Perhaps half of them are so-called guidance vessels, and even prefectures which have no fishing industry are building them to catch tuna, indeed, putting all of their efforts into catching fish, which is a little too much for the private boat owners to stomach.

Government Boats Take Away the Best Fishermen: Moderator: Is there any directly apparent damage from the guidance vessels?

Kojima: There is. First of all, they pick up the best fishermen, because the government boats give a fixed salary and a share of the catch on top of it, so they give a more stable income than the private boats. That is why they can pick the best fishermen and therefore they are cleaning out the fishing grounds in a way that we can't compete with.

Sugano: This word "guidance vessel" sounds good, but in actuality they are far from providing any guidance. It's generally the privately-owned boats that search out the grounds and then the government boats come nosing along afterward. It's really more than we can stand for!

Kojima: They don't do any guiding, and the name is a bit presumptuous. (All agree.)

Moderator: I suppose that this matter of guidance vessels will come to be a problem of administration in the future, but now I would like to hear from Mr. Hayashi on the fish price problem as another one affecting business.

Establishment of Reefers as a Measure to Help Prices: Hayashi: I am always thinking of ways to help the price situation. In addition to propaganda for the consumption of fish and expansion of markets, large refrigerator plants should be built, especially for tuna, so that when big catches are made or when fish are overabundant in a certain district, they could be stored. Then they could be sold when fewer vessels were coming into port. Don't you think that this sort of management would stabilize the price of fish? I would like to have the government finance the construction of refrigerator facilities in a base like this. Our association is selling fish cooperatively, so we feel this need very keenly.

Mabune: With frozen fish we don't have the sort of instability we have with fresh fish. At present the amount of frozen fish is increasing, which means that the amount of fresh fish is declining, but the decline in the amount of fresh fish has not brought about as much of a general price drop as was feared. This is the good effect of refrigeration. Refrigeration on shipboard is still a problem, but on my vessel we have got used to handling it and we are getting just about the kind of prices we plan on. At first, before we were used to it, we sometimes landed poor quality stuff, but now . . . .

Mito: Looking at the figures, frozen fish began to increase sharply around 1953. According to our survey, 1953 was up 50 percent over 1952, it doubled in 1955, and there was another 50-percent increase in 1956. In connection with this rapid increase, if we look at the price situation mentioned by Mr. Mabune, there was a temporary drop in 1952 at the time of the Bikini incident, but since then the price has gone up despite the increased catch, and this year even the price of unfrozen fish has increased.

In other words, this means that by using frozen fish the price can be maintained above a certain limit. This is not to say that it can be increased, but frozen fish can play an important role in stabilizing it within certain limits. Therefore, in response to this stabilized price, must we not hereafter think of ways to improve the pattern of business operations in the fishery? For example, up to now we have been finished with the fish after they have been sold at the auction and have not been concerned with the price thereafter at all. What kind of a marketing structure will give the least spread between the final price and the price to the producer? What kind of a price will keep the consumers from turning away from tuna and at the same time overcome the low state of the resource? These are the questions to which, within the capabilities of the present situation, I would like to get scientific answers. I hope that the Committee will get into these matters.

Moderator: We have put in a lot of time here, and now I wish that Mr. Teramoto, as a member of the Tuna Investigative Committee, would present his views as to what the Committee may do in the future to solve these various problems.

The Fishing Grounds are Overexploited: Teramoto: We have heard may worthwhile comments from all of you, and they are valuable to me as a member of the Committee. I will try to do all I can for you from now on. Various matters have been discussed, but the point is that there is money being made in the tuna fishery and everyone has been trying to get in to share it, so that it can probably be said that the industry is at a peak at present. If it were to continue as it is now it would be fine, but there is no assurance that it will. As has always been said in the past, if a thing gets real good, there is bound to be a reaction, and since the tuna fishing industry is today at the top, we must consider that there is bound to be a day when the reaction will set in and things will get bad. Then those of us who have been in the business for many years and those newcomers who have come into the fishery because there is money to be made there will all go down to ruin together. In that eventuality I hope the government will think very seriously about whether to save those who were already in the fishery or whether to rescue the new operators. I think that there have got to be some real regulatory measures here. Those who have been fishing tuna for 30 or 40 years have been through hard times at least two or three times, and I think that these people who have specialized in tuna fishing must be protected. If it comes to regulation, I would like to have it start with the 90 guidance vessels. The problem is how much actual guidance they are doing under the name of "guidance vessels." This

year is already the peak--will it continue thus for years, or is the fishery already in a dangerous condition? I have just heard various views concerning the resource, and my opinion is that it is playing out. The reason I think so is that, as several of you have stated, the catch rates are actually going down with every cruise. Even though we knew about the increase in juvenile fish that the scientists talk about, we don't know about the increase in growth after that stage, and if it cannot be affirmed that the tuna are decreasing, neither can it be affirmed that they are increasing. Therefore at this time we must investigate these things thoroughly and construct a basic foundation so that, just because there is money to be made in tuna fishing now, everyone won't be allowed to get into the fishery with the result that the old established operators will go broke along with the newcomers.

Moderator: Thank you all for your valuable views and for the time that you have devoted to this discussion.

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CULTURED PEARL INDUSTRY AFFECTED BY HOT SPELL: The most important cultured pearl farms in Japan are located in the Nagoya District at Ago and Matoya Bay in Mie Prefecture. As a result of unusually hot weather in early August the temperature of the water rose suddenly from a normal high of 26° C. (78.8° F.) to 33° C. (91.4° F.) causing an estimated loss of $1,219,280 or 25 percent of the total value of existing pearl oysters (Sources: Local press and Mie Prefecture Office; United States consular dispatch dated September 10).

Pearl Oyster (Avicula margaritifera)

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FISH NET KNITTING MACHINES AND OPERATORS TO GO TO CANADA: It is reported that one of the seven largest Mie Prefecture (Nagoya District) manufacturers is concluding arrangements to send its machines and technicians to Canada under a technical cooperation agreement to make synthetic fiber fishing nets for salmon and trout fisheries. Japanese authorities fear that this move will induce Japanese manufacturers to offer their products at unprofitably low prices in order to sell their stocks before Canadian production commences.

Mie Prefecture has long been a center of one of Japan's oldest industries, the manufacture of fishing nets. Until 1950 all nets were made of cotton or hemp but since then synthetic fibers have become increasingly important. In 1951 only 98,000 pounds of synthetic fiber fish nets were produced; in 1954 production had increased to 894,000 pounds and in 1955 it reached 1,283,000 pounds while in that year 2,182,000 pounds of cotton and 69,000 pounds of hemp fish nets were produced. The Canadian market has always been of major importance to this industry. (United States consular dispatch dated September 10, 1956, from Nagoya.)

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FISHERY PRODUCTS EXPORTS RANK FOURTH IN VALUE: For the first 9 months of 1956, Japan's exports of fishery products ranked fourth in value, or 5 percent of the total value of all commodities exported. Total exports of fishery products from January-August 1956 amounted to 131,481 metric tons (value US$78.3 million), up 79 percent from the 95,889 tons (value US$43.7 million) exported in the same period in 1955.

Note: Values converted at the rate of 360 yen equal US$1.

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OVERSEAS FISHING VENTURES PLANNED: In an effort to develop new fishing grounds to relieve overfishing in the coastal waters of Japan, the Japanese Fisheries Agency has asked for appropriations in the next fiscal year to station a fisheries

officer at Singapore. Also planned is an overseas fisheries promotion association which will be subsidized by the Government. (United States Embassy Dispatch from Tokyo dated September 7, 1956.)

The fisheries officer planned for the office of the Japanese Consulate General in Singapore will supervise fishermen operating in the Indian Ocean and surrounding waters, promote joint fishing ventures with Singapore and Malayan authorities, and develop markets for Japanese fisheries products. The proposed Japanese overseas fisheries promotion association will be an advisory organ to the Government in overseas fisheries development and planning. In addition, the association will take an active part by conducting surveys, opening overseas consultant offices, and developing overseas markets. The undeveloped fishing grounds which the Japanese are currently interested in are waters of the east coast of South America, the Persian Gulf, and the Red Sea.

A later report points out that the Japanese fisheries industry has formed an association known as the Japanese Overseas Fisheries Cooperative Association Agency for the purpose of developing cooperative arrangements with foreign countries for the exploitation of fisheries resources in their coastal waters. The Association has applied for a government subsidy of ¥34 million (about US$95,000) during the next Japanese fiscal year to help it carry out its main objective, which is to relieve overcrowding in Japanese waters by finding substitute employment abroad for Japanese coastal fishermen. The Association will study offers by foreign countries relating to fisheries resource development and will set up overseas branches for the purpose of conducting fisheries resources surveys in various areas of the world in cooperation with the Japanese Government.

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NORTH PACIFIC FACTORYSHIP KING CRAB MEAT PACK THROUGH JULY 1956: The Japanese fleet of six factoryships and 18 attached catching vessels had packed a total of 269,999 cases of king crab meat (48 ½-lb. cans) through July 31, 1956, according to the August 1956, Monthly Statistical Report of Japanese Fisheries.

The pack by area is as follows: Eastern area of Bering Sea, 53,000 cases; Western area of Bering Sea, 31,000 cases; Sea of Okhotsk, 185,000 cases. The pack for the entire season in 1955 made by three factoryship fleets was 206,850 cases. In 1955 the last factoryship left the fishing grounds on September 10.

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NORTH PACIFIC FACTORYSHIP SALMON CATCH FOR THE 1956 SEASON: The 1956 Japanese salmon catch by factoryship-type operations in the North Pacific amounted to 52,015,731 fish as compared with a 1955 catch of 64,043,900 fish. The catch for 1956 includes 28,270,000 fish (47,776 metric tons) from the Russian restricted area (Aleutians and Okhotsk Sea) and 23,745,731 fish from unrestricted areas (Aleutians and Bering Sea), a United States Embassy dispatch dated September 17, 1956 from Tokyo reports.

In addition to the salmon factoryship operations, the catch by the shore-based drift-net fishery in the restricted area was estimated at 5,918,000 fish (mostly pinks) or approximately 8,004 metric tons.

Japanese North Pacific Salmon Factoryship Catch, 1955-56

Area & Year	Sockeye	Pink	Chum	Coho	Chinook	Total
	(1,000 Fish)					
North Pacific Area:						
1956	9,620	11,981	17,165	3,750	136	42,652
1955	12,164	16,508	18,573	3,184	74	50,503
Sea of Okhotsk:						
1956	656	5,366	3,224	116	1	9,363
1955	330	9,412	3,404	392	2	13,540
Grand Total:						
1956	10,276	17,347	20,389	3,866	137	52,015
1955	12,494	25,920	21,977	3,576	76	64,043

Operations by the factoryships in the Russian restricted area fell short 15 percent of the catch limitation of 54,831 metric tons imposed by the Russians.

A summary of the 1956 North Pacific high-seas salmon fishery with comparative data for 1956 is presented in the table.

The pack of canned salmon from the 1955 factoryship catch of about 64 million fish was 1,450,000 cases, total pack from all sources was 1,780,000 cases.

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NORTH PACIFIC WHALING, 1956: Two Japanese whaling expeditions operating in the North Pacific this summer produced 24,922 metric tons of baleen and sperm oil as compared with last year's 19,026 tons, an increase of 31 percent.

Table 1 - Production of Whale Products by Japanese North Pacific Whaling Fleets, 1955-56

Year	Baleen		Sperm		Total	
	Oil	Other 1/	Oil	Other 1/	Oil	Other 1/
	(Metric Tons)					
1956	12,343	13,957	12,579	3,980	24,922	17,937
1955	10,882	11,272	8,144	1,569	19,026	12,841

1/ Mostly frozen and salted.

The total catch in numbers of whales was 3,168 whales (1,570 baleen and 1,598 sperm) as compared with 2,652 whales (1,568 baleen and 1,084 sperm) in 1955. The catch of baleen whales remained at the same level as last year because of the Fisheries Agency's conservation measure of restricting the catch to 800 blue-whale units. The catch of sperm whales increased nearly 50 percent as compared with the previous year. Japanese fishermen belive this is evidence of abundant stocks in the North Pacific.

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REPORT ON TUNA FISHING OFF TAHITI: The Shizuoka Prefecture's fisheries guidance vessel Daifuji Maru (470 tons) with a crew of 51 has been investigating fishing grounds in the South Pacific in the vicinity of Tahiti since June 28, 1956, reports the Nippon Suisan Shimbun (September 7, 1956), a Japanese weekly periodical. The vessel has now concluded its operations after taking 45,000 kan (372,000 pounds) of yellowfin, big-eyed, and albacore tuna at 36 fishing stations. The vessel sent in by radio the following report concerning the fishing grounds around Tahiti and a new fishing ground 1,000 miles ESE. of Hawaii.

On the Tahiti grounds the catch was mostly albacore, but because the season was inappropriate the schools were small and the fishing was not up to expectations. However, it is thought that this will be rather promising ground in the albacore season.

On the new grounds 1,000 miles ESE. of Hawaii, the catch was big-eyed and yellowfin tuna and the schools were extraordinarily concentrated, with as much as 2,000-3,000 kan (16,500-24,800 pounds) taken per station. This area is thought to show more promise for the future than the Indian Ocean.

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SALMON INDUSTRY OF HOKKAIDO: A salmon canning plant at Kushiro in Hokkaido, operated by the Hokkaido Economic Agricultural Cooperative Association (organized by coastal fishermen) was visited by members of the United States Embassy at Tokyo the latter part of June 1956. This is a report on their observations:

The labor force at the plant was about 100, most of whom were females and the capacity of the plant is 800 cases a day, which requires about 50,000 pounds of raw fish. The plant cans only salmon (chums and pinks) caught in coastal waters by small boat owners and the salmon cannery operation lasts only about one month (June) out of the year. During part of the remaining months, other species of fish and some vegetables are canned.

In 1955, Japanese fishermen caught 387 million pounds of salmon of which 268 million pounds were from factoryship-type high-seas gill-net fishing and 119 million pounds were from coastal fishing and inshore fixed-net fishing. The latter type of fishing yielded a catch of 2.4 million pounds. In 1955, the Japanese Government licensed 1,700 sets of fixed nets and 1,800 coastal and high-seas fishing boats.

The coastal salmon catch is important both for canning and for domestic consumption as fresh and salt fish. The high-seas factoryship-type catch is canned, chiefly for export, while the drift-net catch by small boats (nonmothership type fishing) is almost all consumed as salt fish on the domestic market. The industry is of considerable importance both as a source of needed protein for the Japanese and as a source of foreign exchange in addition to its importance in supplying employment for some 65,000 fishermen, points out the August 9 report from the United States Embassy in Tokyo.

Some of those interviewed in Hokkaido seemed to have first-hand knowledge about Russian salmon fishing in the Okhotsk Sea and the Kamchatka peninsula area and all stated that Russian methods are primitive (mainly fixed-net fishing) and that the industry is of insignificant importance to the Russian economy. Furthermore, the Russian contention that the salmon stock is decreasing because of heavy Japanese hauls was said to be entirely unfounded.

Republic of Korea

MARKET FOR MARINE-ANIMAL OILS: Trade in marine-animal oils, both in terms of domestic production and imports, is of minor importance to South Korea, according to a survey made by the Foreign Agriculture Service of the United States Department of Agriculture.

Domestic production consisted of 270 metric tons of fish-liver oil and 30 tons of whale oil. The fish oil is produced in small quantities at a few scattered fish-processing plants. It is possible that the production of oil from marine-animals will increase in the future due to the program now under way to develop latent fishery resources.

The only exports of oils and fats reported in 1955 were 73 tons of marine-animal oils to Japan. Prices at the wholesale level in 1955 were US$30 for a 180-kilogram (about 398 pounds) drum for fish-liver and fish-body oils and US$40-50 a drum for sperm oil.

No imports of marine-animal oils were listed as such in 1955 and 1954. However, some small quantities may be included in unclassified groupings of fats and oils.

Note: Values converted at the rate of 500 hwan equal US$1.

Norway

CANNED BRISLING SARDINE EXPORTS LOWER, JAN.-JULY 1956: During the first seven months of 1956 Norwegian exports of canned brisling sardines have been reduced to only one-half of normal, or to about 20 million kroner (US$2.8 million) in value, points out an October 5 report from the United States Embassy at Oslo.

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FINDINGS IN STUDY OF ARCTIC-NORWEGIAN COD: A comprehensive report on the Arctic-Norwegian cod, published by the Norwegian Fishery Directorate's Ocean Research Institute, contains several noteworthy findings. It reveals that such fish species as cod and haddock, until now considered typical groundfish, probably spend most of their life at higher levels, suggesting the need for a radical revision of Norwegian fishing methods. The study also indicates that the notable decline in the catch of mature cod on the Lofoten banks of North Norway is, in all likelihood, caused by the heavy international trawling in the Barents Sea, feeding grounds of the young cod.

The report presents scores of echographs which conclusively show that cod and haddock to a large extent occur pelagically in big schools. And, contrary to previous notions, they move mostly at upper levels of the sea, not along the bottom. In author Saetersdal's opinion, it is possible that these species are found at the bottom, where they can be caught by trawls, only in relatively short periods. In view of the discovery that cod and haddock spend most of their time at upper levels, he emphasizes the urgent need of developing new fishing methods. Towards that end, the Ocean Research Institute will dispatch an expedition this fall to test the efficiency of float-lines and midwater trawls in pelagic fishing. Meanwhile, the experimental depth-sounding studies of cod and haddock will continue.

A substantial part of the report deals with the wide fluctuations in the stock of the Arctic-Norwegian cod. Since 1860, total landings in the annual Lofoten fisheries have varied between 6 and 40 million mature cod. Comparisons between the Lofoten landings and the number of young cod caught in the subsequent Finnmark fisheries indicate a direct connection, for every fluctuation in the Finnmark fisheries is invariably repeated in the Lofoten fisheries three years later. On the basis of available data, the author offers tentative forecasts for the next two years. The Finnmark fisheries, which were "very good" this year, will be "good" in 1957 and "not so good" in 1958. For the Lofoten fisheries, the catch will be "medium" in 1957, and "above medium" in 1958 and 1959. These predictions do not take into account the extremely high mortality to which the cod spawn are exposed on the banks off the Lofoten islands.

Perhaps the most important chapter in the report is that dealing with the impact of international trawling on the stock of young cod in the Barents Sea, a shallow part of the Arctic Ocean lying northeast of Norway, between Spitsbergen, Franz Joseph's Land, and Nova Zemblia. In this connection the author notes that no less than 700,000 metric tons of gutted Arctic-Norwegian cod was landed by the four leading fishery nations in that area in 1955, an increase of about 100,000 tons compared with 1954. The catch was distributed among the various countries as follows: Soviet Union 350,000 tons; Great Britain 180,000 tons; Norway 160,000 tons; and Germany 10,000 tons. The Soviet catch is estimated on the basis of a few meager data. Thus, it is known that in the spring of 1955 the Soviets were fishing in the Barents Sea with 560 trawlers, including 14 modern factory vessels. In the following five years, the Soviet fishing fleet in these waters was scheduled to be expanded by 75 more factory trawlers. Commenting on these developments, Saetersdal observes: "There is every reason to ask whether the stock of young cod in the Barents Sea can stand being taxed so heavily, and even more, whether it will be able

to endure the further increase in the taxation that can be expected, especially from the fast-growing Soviet fishing fleet."

The Norwegian fishery consultant points out that in recent years the Lofoten fisheries have yielded notably poorer annual catches than indicated by known data on the stock of young cod and the former relationship between young and mature cod. According to Saetersdal, the drop in the Lofoten landings is very likely a result of the heavy increase in the Barents Sea trawling. As this trend will probably continue, he suggests that Norwegian fishermen should in coming years devote more attention to catching the young cod, which are less vulnerable to overfishing than the mature cod found in the Lofoten waters.

Although it can not be asserted that the Barents Sea cod stock is as yet being overtaxed, the question of regulating the trawling operations there is, nevertheless, being considered by Norwegian and British experts. With the present 11-centimeter (4.3-inch) wide mesh, trawls can catch 40-centimeter (15.7-inch) long fish. As these have no commercial value, they are thrown overboard. The salt-fish trawlers even reject most of the fish under 60 centimeter (23.6-inch). If the width of the trawl mesh were to be enlarged, it would spare the younger generations of cod. The Soviet Union, however, is not a member of the international group which seeks to assure the biggest possible fish yield in the North-East Atlantic. And without Soviet participation, says the report, protective measures will have little effect. (News of Norway, September 20, 1956, of the Norwegian Information Service.)

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FOREIGN MINISTRY REQUESTS NORWAY FISHERY PACT WITH RUSSIA: The Norwegian Foreign Ministry through the Norwegian Embassy in Moscow has approached the Soviet authorities with the suggestion that negotiations should be started with the aim of securing agreement on a frontier between Norwegian and Russian sea territory, it was announced in Oslo in September.

According to the Oslo newspaper Arbeiderbladet, it is hoped to establish a joint-fishing belt where Norwegian and Russian fishing vessels can operate side by side. Such an arrangement already exists between Norway and Sweden at the outer reaches of the Oslo Fijord.

Last week four Russian trawlers were discovered within Norwegian waters. Damage was done to Norwegian fishing gear. The Norwegian Embassy in Moscow has asked the Soviet authorities to draw Russian trawler skippers' attention to the Norwegian regulations so that similar contraventions can be avoided in the future. (The Fishing News, September 14, 1956.)

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PELAGIC PURSE-SEINING FOR COD BEING TESTED: The Norwegian fishing vessel Longva recently left the west Norway port of Aalesund to test the superefficient purse seine on the banks off western Greenland. According to the findings of Norwegian ocean researchers, these waters are teeming with cod for about three weeks every summer. If the pelagic purse-seining experiment is successful, it may persuade Norwegian fishermen to consider a radical change in their methods, states the Norwegian Information Service in its August 23 News of Norway.

According to Dr. Birger Rassmussen, of the Norwegian Fishery Directorate's Ocean Research Institute, the waters west of Greenland constitute one of the richest fishing grounds in the world in relation to the effort required. As to the enormous concentration of cod that occurs each summer, he says it is directly caused

by the sinking of cold melt water from the drift ice. To get away from it, the cod follows the warmer water to the surface. "They go in dense shoals, just like herring," he reported on the return from his last study cruise.

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PLAN TO ADVERTISE FRESH FISH: The Norwegian National Association for the Marketing of Fresh Fish agreed at its recent annual meeting to urge the Ministry of Fisheries to effect an advertising campaign to sell more fresh fish in the domestic markets. The sale of fresh fish has declined in recent years. To finance the campaign, the payment of a tax of ½ öre per kilo (about 32 U. S. cents a hundredweight) on all fresh fish sold in the domestic market is proposed. The distributors and not the consumers would pay the tax, according to a September 7, 1956, report from the United States Embassy at Oslo.

Pakistan

FROZEN FISH EXEMPTED FROM EXPORT DUTY: Fresh fish frozen in cold storage under low temperatures before export is exempted from export customs duty, according to Customs Notification in the Gazette of Pakistan dated August 31, 1956. Under Item 10 (i) of the Second Schedule of the export tariff fresh fish was chargeable at the rate of Rs. 5/- per maund (82 pounds).

In a previous notification dated March 4, 1955, the Government of Pakistan in an effort to expand the country's export of fish withdrew the duty on fresh fish processed and frozen before export.

The effect of the present notification means, therefore, that all frozen fresh fish, whether processed or not, is permitted to be exported free of export duty, points out a September 7 United States Embassy dispatch from Karachi.

Portugal

COD FISHING FLEET REPORTS GOOD CATCHES ON NEWFOUNDLAND AND GREENLAND BANKS: The fish catch by the Portuguese fleet on the Newfoundland and Greenland banks has been unusually large this year, points out a United States dispatch from Lisbon (September 6, 1956). Modern equipment for locating schools of fish was mentioned as an important aid, as well as quick work in fitting out dories and the greater speed by which motor-powered vessels are able to follow the fish. Better catches were made because of the use this year of better and more expensive bait purchased from suppliers in Nova Scotia, Newfoundland, and Norway. It was reported that fresh mackerel, as well as squid and herring were used with special success as bait.

Almost all vessels of the cod fleet were reported returning fully loaded this year a month or so ahead of the usual schedule and many units of the fleet of 70 to 80 vessels were expected to return to the banks for further fishing. Fish have not been as abundant on the banks for many years, according to returning fishermen. Both trawlers and hand-line fishing vessels have met with considerable success.

An abundant cod catch should be of substantial assistance in increasing Portugal's protein food supplies and assisting the Government in efforts to maintain

stable prices at a time when the cost of living had risen. The demand for cod since last year to fill the gap in meat supplies resulted in substantial imports of cod from Norway and other supplying countries with a corresponding loss in foreign exchange.

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FISHERIES TRENDS, JUNE 1956: Sardine Fishing: Sardine catches in Portugal during June 1956 improved over the very low landings for May but were still well below normal. The catch of sardines for June 1956 amounted to 1,522 metric tons (value US$329,000) as compared with 5,917 tons (value US$655,000) in June 1955. Sardines purchased by the packing centers during the month amounted to only 655 tons (valued at US$169,600). The balance was absorbed for immediate public consumption. The principal sardine ports in June were Portimao, Olhao, Matosinhos, and Villa Real Santo Antonio. About 53 percent of the catch was landed at Portimao. The port of Matosinhos had about 138 tons, the August 1956 Conservas de Peixe reports.

Other Fishing: Landings of fish other than sardines totaled 5,879 metric tons (valued at US$974,713 ex-vessel) and consisted principally of anchovy (1,995 tons) and chinchard (3,008 tons) and 876 tons of mixed (mostly tuna and mackerel).

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CANNED FISH EXPORTS, JANUARY-JUNE 1956: Portuguese canned fish exports in June 1956 totaled only 2,173 tons (114,000 cases), valued at US$1.3 million, as compared with 4,480 tons, valued at US$2.1 million, for the same month in 1955.

Portuguese Canned Fish Exports, January-June 1956

Species	January-June 1956	
	Metric Tons	1,000 US$
Sardines in olive oil	13,838	7,274
Sardinelike fish in olive oil	2,125	1,840
Sardines & sardinelike fish in brine	562	108
Tuna & tunalike in olive oil	470	383
Tuna & tunalike in brine	124	69
Mackerel in olive oil	680	421
Other fish	236	111
Total	18,035	10,206

For the first six months of 1956, canned fish exports amounted to 18,035 tons (949,000 cases) valued at US$10.2 million as compared with 27,292 tons valued at US$14.0 million for the same period in 1955. Sardines in olive oil was the leading product exported.

In June 1956 France was the principal buyer of Portuguese canned fish, followed by Germany, the United Kingdom, and the United States.

For January-June 1956, the leading canned fish buyer was Germany with 3,217 tons (valued at US$1.7 million, followed by the United Kingdom with 2,024 tons (valued at US$1.1 million), the United States with 2,004 tons (valued at US$1.6 million), and Italy with 1,883 tons (value US$1.1). Exports to the United States consisted of 843 tons of sardines, 997 tons of anchovies, and 10 tons of tuna.

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CANNED FISH PACK, JAN.-APRIL 1956: The Portuguese canned fish pack (811 tons) in April 1956 continued very light and consisted of principally sardine-like fish. The canned fish pack for January-April amounted to 1,740 tons (91,600 cases), the August 1956 Conservas de Peixe points out.

Portuguese Canned Fish Pack, Jan.-April 1956

Product	Net Weight	Canner's Value
	Metric Tons	1,000 US$
In Olive Oil:		
Sardines	574	348
Sardinelike fish	1,035	1,055
Tuna	45	48
Other species (incl. shellfish)	28	20
In Brine:		
Sardinelike fish	32	9
Other species	28	6
Total	1,740	1,486

Note: Values converted to US$ equivalent at rate of 28.75 escudos equal US$1.

South-West Africa

SKIPJACK TUNA NETTED NEAR WALVIS BAY: The South-West Africa fishing vessel Kittywake reported catching 150 oceanic bonito or skipjack tuna with lampara seines during July. The school of skipjack tuna was encountered, while the vessel was under way from Luderritz to Walvis Bay. Unprepared for fishing, most of the school disappeared by the time the net was set. The crewmen on the Kittywake thought that if the net had been set more quickly that a larger catch would have been made.

The fish averaged about 15 pounds each. When gutted, it was found that their stomachs were full of small white shrimp about three-quarters inch long. The fish apparently did not see the twine while the net was being pursed. It is claimed that the type of synthetic fiber twine used in the net creates very little disturbance in the water. The report also stated that a number of companies at Walvis Bay have inquired about the use of same type of nets used by the Kittywake for such fish as bonito and yellowtail. The skipjack is reported to be uncommon in South Africa, but is fairly abundant off Angola. (South African Shipping News and Fishing Industry Review, August 1956.)

Spain

FISHERIES TRENDS, AUGUST 1956: Fishing: Fish catches sold on the Vigo fish exchange during August 1956 totaled 11.7 million pounds valued at US$1,074,148, a decrease in quantity of about 12.7 percent as compared with July and 23.7 percent below August 1955. Average prices for first sales in August were 9.1 U. S. cents a pound as compared with July and 23.7 percent below August 1955. Average prices for the first sales in August were 9.1 U. S. cents a pound as compared with 10.9 U. S. cents in July and 5.5 U. S. cents in August 1955.

The lower average prices in August were probably due to smaller catches of high-priced varieties, such as albacore tuna (Germo alalunga) and to a greater abundance of the low-priced needlefish (Ramphistoma belone) and horse mackerel (Sciaena aquila lacep). The catch of albacore decreased from 5.6 million pounds in July to 1.8 million pounds in August. The average price for albacore was 14.5 U. S. cents a pound in July and 16.8 U. S. cents a pound in August.

Fish Canning: During August the fish canneries in the Vigo area purchased 3.7 million pounds of fresh fish at the Vigo fish exchange as compared with 4.9 million pounds in July and 5.4 million pounds in August 1955. The decrease in purchases by comparison to July was attributed in part to the lower catches of albacore. Other varieties purchased by fish packers wore needlefish, which is packed in oil as a substitute for sardine (Sardina pilchardus W.) and horse mackerel.

Reports indicated that some fish packers were curtailing purchases of fresh fish on account of the difficulties encountered in obtaining an adequate supply of tin plate and olive oil. The fish canning industry regards this as its main problem at the present time, and little seems to have been done officially toward a satisfactory solution (September 11 dispatch from United States Consulate in Vigo).

Note: Value converted at one pesata equals 2.56 U. S. cents.

Sweden

CARE OF FROZEN FOODS STRESSED BY HEALTH AUTHORITIES: Frozen foods and the so-called "freezing chain" were discussed thoroughly by the Swedish General Health Association at a three-day conference held in September at Halsingborg, Sweden. The Association membership consists of Swedish health authorities, district physicians, and veterinary surgeons, according to a September 17 report from the United States Consulate at Goteborg.

The Association considers that quick-frozen foodstuffs should be better taken care of by wholesalers and retail dealers and recommends more rigorous regulations regarding sanitary conditions in shops.

Dealers, the Association stated in a resolution adopted at the conference, must learn to measure the temperature of the quick-frozen goods. The importance of shipments in wholesale lots was also stressed. The resolution also said that shop freezing, whereby fresh foodstuffs are placed in freezing counters in retail shops, must be prevented. It was also held to be desirable that the manufacturers should date-stamp foodstuffs particularly shrimp, fatty types of fish, etc.

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IMPORTS FROM THE DOLLAR AREA LIBERALIZED: The Swedish State Agricultural Marketing Board (Statens Jordbrukensnamnd) in a circular announcement of August 7, 1956, corrected the dollar-free list and the transit-dollar simport lists. The dollar-free list (commodities within the jurisdiction of the Board which can be admitted to Sweden without import license from dollar-area countries) includes the following fishery and related products (statistical number precedes the commodity in parentheses): (33) fresh halibut; (38) fresh rayfish; (46,50-51) salted and dried fish, excluding sprats, anchovies, mackerel, herring and Baltic herring (stromming); (54) spiced or sugar-cured fish, excluding sprats, anchovies, herring and Baltic herring; (55) dried fish (fresh-dried fish), excluding ling; (56) smoked fish; (57-59) fish roe, salted or prepared in another manner; (60) oysters; and (62, ex 63) crustaceans (as well as unspecified mussels), excluding lobster and deep-sea shrimp; (76) tortoise shell, mother-of-pearl, also mussel and snail shells, unworked; (315-317) canned fish and shellfish.

The transit-dollar list (commodities originating in the dollar area for which import licenses are granted) includes (251) fish-liver oil; (252:2) fish oil, other kinds; (ex 253:2) lard oil and sperm oil; and (ex 281) crayfish tails (United States Embassy dispatch dated August 31, 1956).

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LOAN PROGRAM FOR COMMERCIAL FISHERMEN: A program for the granting of loans to Swedish fishermen and owners of commercial fishing vessels has been in existence for about 50 years. Loans are granted for the purchase of vessels, motors, or other machinery, gear, and for shore-side equipment, such as packing buildings, vehicles, and fish culture.

Funds for loans are controlled by the Swedish Board of Fishery. The Board does not make loans directly to fishermen or owners of fishing vessels but to economic associations and county councils throughout the country, who in turn extend loans to the fishermen or owners of vessels within their jurisdiction or membership.

No installments or interest are required during the first two years, but thereafter an interest rate of 3.6 percent is charged on the amount of the outstanding loan. Loans must be repaid within a period of 12 years, with equal payments each

year after the first two, plus accrued interest. When yearly installments are not paid within the specified time, an interest of 6 percent is charged from the due date, until payment is made, according to a September 18, 1956, dispatch from the United States Consul General in Goteborg.

The maximum amount that may be granted in a single year by rural economic associations or county councils to an individual fisherman or to an individual owner of a vessel is US$23,000. The Swedish Government contributed US$387,000 annually to the fund during 1950-53, US$580,000 in 1954, US$ 773,000 in 1955 and US$503,000 in 1956.

The average loan extended by the economic associations and county councils amounts to between US$1,900-3,900. The demand for loans has steadily increased during the past few years. The restrictive credit policy established by the Swedish Government in 1956 has reduced the amount made available to the fishery fund in 1956.

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NEW FISH FREEZING FACILITIES PROPOSED FOR GOTEBORG: The Swedish West Coast Fishermen's Fish Processing Association has applied to the Swedish government for a loan of 1.5 million crowns (US$291,000) for the erection of a building for the processing and quick-freezing of fish. In considering this loan application, the Fishing Board is reported to have suggested that the amount of the loan be reduced to 700,000 crowns (US$136,000), states a September 19, 1956, dispatch from the United States Consulate in Goteborg.

It is calculated that the total cost will amount to about 6.5 million crowns (US$1,260,000). The building itself is estimated to cost 4.35 million (US$843,000). The structure is to be built at the western end of the fish harbor and it is expected that about 200,000 crowns (US$38,000) will be contributed by the Goteborg harbor authorities for pulling down the buildings at present occupying this area. The Association hopes that it will be possible to raise about 5 million crowns (US$989,000) among the fishing industry organizations.

The buildings to be erected will contain five floors. It will be 171 feet long and 85 feet wide and will have a roof garden. It will contain a deep-freeze plant, premises for the processing of fish, including filleting machines, cold-storage rooms, and office quarters.

It is planned that the deep-freezing capacity will be 50 metric tons a day. If this capacity is utilized 120 days a year, this would mean that 6,000 metric tons annually would be frozen. It will be possible to keep about 1,200 metric tons in cold storage, corresponding to an average storage period of two months.

According to the chairman of the Association, it is essential for the continued existence of the Swedish west coast fishing industry that this building be erected. At present, the possibilities of freezing fish landed in the port of Goteborg are very limited, and the fish often have to be transported long distances for this purpose, for instance to Malmo which is about 186 miles from Goteborg.

Another reason why the realization of this project is considered so important is that Swedish imports of quick-frozen fish have increased enormously during the last few years. In 1954, about one-half of the frozen fish consumed in this country was Swedish, while in 1955 only one-third was of Swedish origin.

The consumption of fresh and frozen fish totaled approximately 80,000 metric tons in 1955, expressed in terms of the weight of the fish when landed.

A striking development in the consumption of fish in Sweden during recent years has been the increase in the consumption of quick-frozen fillets. From an insignificant part of the total fresh fish consumption in earlier years the quantity reached 10 percent of total consumption in 1954 and approximately 20 percent in 1955, which means that in that year about 16,000 metric tons of quick-frozen fish was consumed.

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WORKMEN'S COMPENSATION ACT COVERS FISHERMEN: The commercial fishing vessels of Sweden are predominately operated by their owners on a share basis, and seldom have hired crews. While there are about 12,000 full-time and 7,000 part-time professional fishermen engaged in sea fishing, only a few worked for wages in 1955.

The few hired fishermen are covered by the Workmen's Compensation Act of 1954, generally referred to as "The Occupational Injuries Insurance Act," which went into effect on January 1, 1955. Insurance under this Act is compulsory for all persons employed in Sweden (Swedish citizens and aliens, private and public employees). The cost is met by employers' premiums which are set in relation to the work hazards of the plant or industry concerned. Occupational injuries insurance is coordinated with general compulsory sickness insurance, the sickness insurance funds taking care of cases of occupational injuries (work accidents and occupational diseases) causing disability up to 90 days. Sickness insurance is financed by policy holders' State subsidies, and employers' premiums (1.4 percent).

The general rules governing insurance of the self-employed also apply to the self-employed fishermen:

1. Under the General Compulsory Sickness Insurance Act the self-employed are entitled to compensation for the cost of medical treatment and hospitalization to the same extent as employees, and to a basic daily allowance of about 58 U. S. cents which can be increased by a supplemental insurance. For employees, supplemental insurance is compulsory.

2. Under the Occupational Injuries Insurance Act they may take out voluntary insurance providing the same benefits as the compulsory insurance of employees. Voluntary insurance may also cover accidents off the job. Voluntary insurance policies are written by those companies administering compulsory occupational injuries insurance, primarily the National Insurance Office, either individually, or collectively for the members of Swedish professional organizations or trade unions.

Prior to the coming into effect of the new legislation in 1955 there was a Royal Decree of 1918 enabling fishermen to take a voluntary State-subsidized individual accident insurance with the National Insurance Office. This insurance was cheaper than the voluntary insurance under the Occupational Injuries Insurance Act of 1954 and benefits were lower--10,500 fishermen held such insurance policies in 1954.

According to information furnished by the National Insurance Office 6,071 fishermen are at present holding occupational injury insurance policies through their professional associations. Eleven fishermen's associations have signed insurance contracts on behalf of their members, one of them, the Swedish West Coast Fishermen's Association representing 5,191 policyholders. In addition, there are fishermen taking individual insurance policies, but they are few.

Turkey

MARKET FOR MARINE ANIMAL OILS: From the standpoint of both production and foreign trade, marine oils are of minor importance to Turkey's economy, according to an April 27, 1956, dispatch from the Foreign Agricultural Service of the U. S. Department of Agriculture.

The only marine oil produced in Turkey is that derived from the Dolphin (marine mammal). Production from this source totaled 2,500 metric tons in 1954 and the 1955 production was estimated at 1,500 tons. Exports of marine-animal oil were not classified as to type and consisted only of 464 metric tons, principally to Czechoslovakia, Somaliland, and Bulgaria. No marine animal oils were imported.

Union of South Africa

CENTRAL SALES ORGANIZATION FOR CANNED FISH SET UP: Production and sales of canned fish by nine companies, representing four of the largest groups in the fishing industry of South and South-West Africa, have formed a central sales organization to be known as Federal Fish Packers Ltd. Announcing this merger, the South African Shipping News and Fishing Industry Review says its information is regarded by the South African fishing industry as "one of the most significant developments yet in the eventful history of fish canning on the West Coast. It represents the culmination of a number of previous attempts to achieve some forum of coordination in the sales of canned fish from the inshore fishing industry.

"It is no secret that the fish canners of South and South-West Africa have been feeling the pinch of intense competition on the world markets for their products," says the paper. "This in turn has revealed obvious weaknesses in the present system whereby each of several companies has acted on its own in markets abroad."

Although several companies remain outside the new combine, the organization represents a very substantial section of the fish canning industry with 7 spiny lobster canneries. The combined firms' investment in factories, boats, and other equipment is nearly half the total investment in the inshore fishing industries of South and South-West Africa.

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ECHO-SOUNDERS IN DEMAND BY FISHING FLEET: Echo-sounders for locating fish in Cape waters were in such demand in the Union of South Africa that they were being flown from Europe to Cape Town for the fishing fleets. These sounders were then installed in vessels fishing off the Cape's west coast. In six weeks from June to the end of July, one Cape Town firm alone received orders for 60 echo-sounders; while others were able to sell every instrument in stock. Reportedly, the sudden demand was so insistent that many instruments were flown to Cape Town from overseas, principally from Germany.

According to fishing concerns in Cape Town, this surge towards echo-finders is the start of a new era in scientific fishing. Fishermen in South Africa reportedly to date relied primarily on their skill and experience to reap their catches while the fish were plentiful, but for the past two seasons the movement of the shoals has been erratic and elusive, states a dispatch (August 2) from the United States Consulate at Cape Town.

Factory operators and fishermen on the Cape west coast in investigating more exact methods for locating shoals of fish now are finding the answer to some of

their problems in the echo-sounder. It is understood that echo-sounders have been in use for some years now in the trawling fleets and in the live-fishing boats of Natal and the Cape east coast and have been a most worthwhile investment.

Echo-sounders currently being sold are principally from Kiel, Germany, marketed at approximately £300 (US$840) each.

In 1952, when the Cape West Coast is said to have reached a peak of 300,560 tons of fish, a few fishermen reportedly tried out the echo-sounders with marked success. By the end of August this year, it was estimated that about 70 Cape Shoal fishing boats would be equipped with echo-sounders.

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PILCHARD-MAASBANKER CATCH THROUGH JUNE 1956 POOR: A poor pilchard-maasbanker (jack mackerel) season has hit the 16 factories and 220 fishing boats of the Union of South Africa's west coast. This year the fish have not been running and for six months boats have searched, too often in vain, for the elusive pilchard and maasbanker. The total catch of pilchards and maasbanker from January until the end of May 1956 was only 70,869 short tons and June did not add very much to this total.

Union of South Africa's Maasbanker and Pilchard Catches, January-May 1956 With Comparisons

Period	Maasbanker	Pilchard	Total
	(Short Tons)		
1956:			
January	23	3,634	3,657
February	593	7,316	7,909
March	690	24,089	24,779
April	3,382	20,179	23,561
May	7,993	2,970	10,963
1955:			
January	4,730	35	4,765
February	15,546	22,468	38,014
March	2,324	47,905	50,229
April	23,129	9,032	32,161
May	25,539	17,080	42,619
January-May 1956	12,681	58,188	70,869
January-May 1955	71,268	96,520	167,788
12 Months 1955	86,885	134,424	221,309
12 Months 1954	130,228	97,336	227,564
12 Months 1953	93,140	150,987	244,127

Some relief has come from a better than average catch of mackerel which, by the end of May, had reached 28,740 tons. Mackerel does not count in the 250,000-ton quota for the Cape west coast and so the industry has nearly 180,000 tons of pilchards and maasbanker to catch from the beginning of June until the end of the year. The former closed season is no longer enforced and the boats fish until the quota is reached or the year ends.

By early July there were fair indications that the worst period may well be over. One hopeful sign has been a slight rise in the sea temperature.

Warmer water might well bring them back. In the meantime factories and fishermen are eking out the season as best they can. A constant search is going on and the familiar areas have been thoroughly combed. In addition, the fishing companies engaged the services of a light aircraft which made a number of spotting trips over St. Helena Bay and further south, but results up to the end of June had been "negative."

Another and even more practical way of easing the shortage was found by a number of the larger and more powerful boats. Big shoals of fish appeared in False Bay and so these boats traveled south, rounded Cape Point, and went in and caught them. The furore subsequently raised by False Bay fishermen resulted in the closing of the Bay to pilchard and maasbanker netting.

With catches low, some of the factories are reported to have temporarily closed canning lines. But these would soon come into full operation if the fish return with a rush.

The most significant figures are those for maasbanker. In the first five months of this year, usually the best maasbanker months, the catch was 12,681 tons, compared with 71,268 tons during the same period last year.

In the first five months of this year, 58,188 tons of pilchards were caught, compared with 96,520 tons over the same period last year.

The total catch of pilchards and maasbanker until the end of May this year was, therefore, less than half the total of 167,788 tons for the same period last year (see table).

But while the Cape fishery is having a poor season, Walvis Bay in South-West Africa has had excellent catches. In the season which started in February, a total of 122,222 tons of pilchards had been caught by the end of May as compared with 80,878 tons landed by the end of May last year. The season last year did, however, start a month later, in March. As in the Cape, Walvis Bay has a quota of 250,000 tons and fishing stops when this figure is reached, which is likely to be well before the end of the year, states the July 1956 issue of The South African Shipping News and Fishing Industry Review.

A later dispatch, dated September 7, from the United States Consulate in Cape Town states that fishing in Union waters improved during July and August. Canned fish production was also high; demand for canned fish particularly in the United Kingdom, remained firm and large quantities were exported.

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FISHERIES TRENDS, AUGUST 1956: Overseas demand for South African fish oil was strong during August and exports of fish oil were limited due to heavy commitments of the South African fish-oil industry

Canned and frozen spiny lobster production was seasonally low due to very unfavorable weather; however, with a strong overseas demand, particularly from the United States, stocks of canned and frozen spiny lobster held by South African companies were quickly liquidated.

U.S.S.R.

MURMANSK--A MAJOR FISHING PORT: Forty years ago there was no Russian ocean fishery off the Murmansk coast in the Barents Sea. Today Murmansk is is one of the world's largest fish harbors and a base for 500 modern fishing vessels, according to a report in Dansk Fiskeritidende (August 17, 1956), a Danish fishery periodical. Most of the vessels are large trawlers, but about 50 fish for herring with gill nets. There are large repair yards for the fishing fleet. Last year Murmansk received 640,000 metric tons of fish--which reveals how much the Soviet Union has expanded its ocean fisheries in less than two-score years.

There are large fish-processing plants in Murmansk--filleting plants, smokeries, and canneries--but the daily supply of fish is so large that a part must be sent elsewhere for further handling.

Large quantities of fish are sent to Moscow by airplane or in refrigerated cars attached to express trains. The quality of the fish is first class when it reaches Moscow, where the demand is great and the prices good.

It is noteworthy that the Murmansk trawlers, because they are very particular about the quality of the fish, do not remain at sea longer than 7 days.

Fish are handled in Murmansk in a sanitary and effective manner. Automatic conveyors are widely used. Much is done to produce various types of canned fish. There is a large production of fish cooked in oil, and there are many types of smoked fish produced.

Fishermen on the large ocean vessels, which are owned by the State, receive a fixed wage and a certain percentage of the catch. A fisherman can earn from 35,000 to 60,000 rubles (the approximate equivalent of US$1,400-2,000) a year.

The Soviet Union has no problems whatsoever in disposing of the catches. All fish landed can be sold within the boundaries of the country and the quantity could be doubled many times. Thus, the Russian ocean fleet could be increased almost endlessly. Expansion is occurring currently to such a great degree that it is only a question of time until the Soviet Union can supply all its needs.

United Kingdom

CANNED SARDINE MARKET: The production of sild, pilchard and brisling, the sardinelike fish canned in the United Kingdom, amounted to 3,646 short tons in 1955 as compared with 2,385 tons in 1954 (table 1). The importance of this production is relatively small in terms of total consumption and in terms of the total catch of the entire British fishing industry. As might be expected, however, production of sardinelike fish has some local importance, namely in Cornwall, where the pilchard-canning industry has been a growing one since World War II.

Table 1 - United Kingdom's Catch of Sardinelike Fish, 1953-55

Species	1955	1954	1953
	... (Short Tons)		
Brisling	503	347	290
Pilchards	2,077	1,232	2,326
Sild	1,066	806	524
Total	3,646	2,385	3,140

Although some sardines are canned in the United Kingdom, the quantity is insignificant. Only fish of the European varieties of immature pilchards may be sold

Table 2 - United Kingdom's Supply of Canned Sardinelike Fish, 1954-55

Type	Sardines		Brisling		Pilchards		Sild		Total	
	1955	1954	1955	1954	1955	1954	1955	1954	1955	1954
	(Short Tons)									
Domestic pack	-	-	256	120	2,016	2,077	756	584	3,028	2,781
Imports	6,682	8,110	947	1,888	8,692	4,002	164	315	16,485	14,315
Total Supply	6,682	8,110	1,203	2,008	10,708	6,079	920	899	19,513	17,096

as sardines in the United Kingdom, an August 27 dispatch from the United States Embassy in London states. (The Embassy understands that this ruling arose out of litigation in 1915 involving a Newcastle firm and a Norwegian product. According to a source in the Ministry of Agriculture, Fisheries and Food, Maine and California sardines are known in the United Kingdom only as pilchards.)

Consumption trends for canned sardinelike fish have been upward (see table 2), probably because of the shortage of canned salmon. Supplies of pilchard from the Union of South Africa and South-West Africa were three times as great in 1955 as supplies of imported canned pilchard from all sources in 1938. There is a demand for "true" sardines, and its satisfaction depends to a large extent on a good Portuguese pack.

Table 4 - Retail Prices of Sardinelike Fish in London Area, Mid-1956

Product	Origin	Packing Medium	Type of Can	Weight	Price Per Can	
					British Currency	U. S. Currency
					s. d.	¢
Pilchards	South Africa	Natural	Tall	8 oz.	1s.	14
	" "	"	"	1 lb.	1s. 4d.	19
	" "	Tomato	Oval	1 lb.	1s. 8d.	23
	British	"	"	7 oz.	1s. 1d.-1s. 3d.	15-17
	"	"	"	14 oz.	1s. 10d.	26
	"	"	Tall	9½ oz.	1s. 6d.	21
	"	"	"	15 oz.	2s.	28
	South Africa	"	"	1 lb.	1s. 5d.	20
	" "	"	Oval	8 oz.	1s.	14
	South-West Africa	"	Tall	15 oz.	1s. 4d.	19
Sardines	Portugal	Olive oil or tomato	Flat rectangular	4-4¼ oz.	1s. 1d.-1s. 6d.	15-21
	"	Olive oil	" "	7 oz.	2s. 3d.-2s. 6d.	32-35
	"	" "	" "	3¼ oz.	1s. 7d.	22
	France	" "	" "	3¼ oz.	3s. 6d.	50
	"	" "	" "	6½ oz.	6s. 6d.	91
	"	" "	" "	4 oz.	2s.	28
	"	" "	" "	6 oz.	3s. 9d.	52
Sild	Norway	Olive oil or tomato	" "	3¾ oz.	1s. 6d.-1s. 11d.	21-26
	"	Olive oil	" "	3¾ oz.	1s. 1d.	15
	British	Tomato	" "	1¾ oz.	8d.	9
	"	"	" "	3¾ oz.	1s. 1d.	15
Brisling	Norway	"	" "	3¾ oz.	1s. 10d.	26
Herring	British	"	Oval	7 oz.	1s. 2d.	16
	"	"	"	4½ oz.	10d.	11

The most popular can sizes are:

(a) Sardines--¼ club (4-oz. flat rectangular with rounded corners), in olive oil and in tomato sauce; probably represents 80 percent or more of total consumption.

(b) Pilchard--7-oz. and 8-oz. oval and flat and 1-lb. tall or oval, in tomato sauce with some in brine.

(c) Sild and brisling--dingley (3¾ oz. flat rectangular with rounded corners, mostly from Norway, Denmark, and Holland); packed in oil and in tomato sauce.

There is a very wide variety of canned sardinelike fish, including canned small herrings, on the British market. They are retailed in a wide price range in numerous sizes and shapes of cans up to 1-lb. net. Currency difficulties affect imports from the United States. Present imports come from sterling and soft-currency areas.

Table 3 - Canned Sardinelike Fish Imports into United Kingdom, 1954-56

Product & Principal Country of Origin	January-April 1956			12 Months 1955			12 Months 1954		
	Quantity	Value		Quantity	Value		Quantity	Value	
	1,000 Lbs.	£1,000	US$1,000	1,000 Lbs.	£1,000	US$1,000	1,000 Lbs.	£1,000	US$1,000
Brisling:									
Norway	82	21	60	1,867	507	1,421	3,760	1,045	2,925
Denmark	6	1	3	23	4	10	15	3	7
Other	1	1	1	5	1	2	1	1/	1
Total	89	23	64	1,895	512	1,433	3,776	1,048	2,933
Pilchards:									
Union of South Africa	10	69	193	49	328	919	21	154	431
South-West Africa	49	347	973	124	799	2,237	59	374	1,046
Other	1	1/	1/	1	1/	1/	1/	1/	1
Total	60	416	1,166	174	1,127	3,156	80	528	1,478
Sardines:									
France	1	12	34	1/	11	29	2	50	140
Portugal	25	376	1,053	132	1,842	5,158	147	2,038	5,707
Yugoslavia	-	-	-	-	-	-	3	25	70
French Morocco	1/	1	3	1/	1	3	8	107	300
Other	1	6	15	2	13	36	2	21	59
Total	27	395	1,105	134	1,867	5,226	162	2,241	6,276
Sild:									
Norway	2	37	104	3	63	177	6	121	338
Other	-	-	1/	1/	1	3	1/	1/	1/
Total	2	37	104	3	64	180	6	121	338
Grand Total	178	871	2,439	2,206	3,570	9,995	4,024	3,938	11,025

1/Less than 1,000 lbs., £ 1,000, or US$1,000.

Domestically produced supplies go through the normal channels: factory, wholesaler, and retailer. Imports are made by first-hand distributors, brokers, or agents and thence distributed to wholesalers and retailers.

* * * * *

FISH MEAL PRODUCTION INCREASE SOUGHT: In spite of greatly increased production of fish meal at the English fishing ports of Hull and Grimsby, which produce about 70 percent of Britain's supplies, there are still big deficiencies and the Government spent more than £7 million (US$19.6 million) in 1955 for imports to meet the demand.

The British Trawlers' Federation believes that this sum could be saved if more incentives to home production could be given, and the matter will be discussed at a federation meeting in September.

It is also felt by the producers of fish meal that they might well be allowed to explore foreign markets with their fish meal, to win new business and thus help in the country's economic position.

Largely because it was felt that British bacon had suffered from the use of inferior meals in feeding, Hull and Grimsby fish meal factories in October 1955 pooled their resources to manufacture a new pure white fish meal, which is sold under one brand name.

This meal was the first to carry a triple guarantee of purity and quality with protein content fixed at 66 percent, with oil and salt at less than 4 percent and 2 percent, respectively.

The two factories produce about 70 percent of the British fish meal output in the ratio of about 40,000 tons annually at Hull to 30,000 tons at Grimsby.

In July 1956 the British Trawlers Federation stated that manufacturers of Hull and Grimsby had given valuable assistance towards Britain's efforts to cut down on imports.

Production and sales had soared to the record level of 26,022 tons in the first six months of 1956, an increase of 32.5 percent, and this increased production meant a reduction in imports of fish meal and a substantial saving in overseas payments. It was a great step forward because, since the war, imports of marine protein had grown year by year.

British trawler owners naturally feel that through the meal factories, which are nonprofit-making companies working on a cooperative basis in the industry, they could completely offset all imports of white-fish meal if it could be made possible for them to catch white fish solely for the manufacture of meal.

Every processor, trawler owner, fish merchant, and curer is a shareholder in the Hull and Grimsby fish meal companies. (Approximately $4\frac{1}{2}$ tons of fish offal is needed to manufacture one ton of white-fish meal.) A continuous process system is worked at the two plants for 365 days a year and between 200,000 and 230,000 tons of surplus fish and trimmings is processed annually, with a maximum of 1,400 tons a day (Fishing News, September 14).

* * * * *

INTEREST RATES ON LOANS FOR VESSELS AND GEAR INCREASED: The British White Fish Authority has announced that, as a result of a recent rise in the rates of interest charged to them by the Treasury, their own rates of interest will be increased on loans effective August 30, 1956. The new rates are: on loans for not more than five years, $5\frac{1}{4}$ percent; on loans for more than five years but not more than 15 years, $5\frac{3}{4}$ percent; on loans for more than 15 years, $5\frac{1}{2}$ percent.

The other terms and conditions of the Authority's arrangements for loans are unchanged according to The Fishing News, September 7, 1956.

The Authority's loans are connected with the building of new fishing vessels of not more than 140 feet; the purchase, in certain circumstances, of new engines and nets and gear for inshore vessels; the construction and equipment of processing plants; and the formation and development of cooperative organizations.

Interest rates previously payable of $4\frac{3}{8}$ percent for loans up to five years, and $4\frac{3}{4}$ percent for those of more than five years, became effective on August 13, 1955. A previous increase to 4 percent and $4\frac{1}{2}$ percent, respectively, had taken place only a few weeks earlier on July 9, 1955.

FEDERAL ACTIONS

Department of the Interior

FISH AND WILDLIFE SERVICE

FISHERIES LOAN FUND ACTIVITIES INITIATED:

Terms and conditions for the granting of loans under the newly-created fisheries loan fund, authorized by the Fish and Wildlife Act of 1956, were announced October 17, 1956, by the Secretary of the Interior. The loan fund will be administered by the Fish and Wildlife Service.

The regulations establishing the required administrative procedures were published in the Federal Register on October 18.

The loan fund was created under the authority of the new Fish and Wildlife Act, approved by the President on August 8, which empowered the Secretary of the Interior "to make loans for financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels, and for research into the basic problems of fisheries." Loans cannot be extended for any phase of a shore operation.

Secretary Seaton explained that the rate of interest on all loans granted is fixed at five percent per annum. The period of maturity of any loan shall be determined and fixed according to the circumstances, but in no event can it exceed a period of 10 years.

Loan application forms and instruction sheets for filling out the forms, plus a copy of the regulations, became available from the Fish and Wildlife Service beginning October 22. The Act authorized $10 million to provide initial capital as a revolving fund for these loans. Under the terms of the Act, a loan may not be granted unless reasonable financial assistance applied for is not otherwise available on reasonable terms.

Persons in the United States and territorial possessions who desire loans should obtain an application form and instruction sheet from the nearest Fish and Wildlife Service Fishery Market News Office. These offices are located in New York City, Boston and Gloucester, Mass., Hampton, Va., New Orleans, La., San Pedro, Calif., Seattle, Wash., and Chicago, Ill. In Alaska applications may be obtained from the Service's Fishery Products Laboratory in Ketchikan and the Service's office in Juneau; in Hawaii from the Service's Laboratory, 2570 Dole Street, Honolulu.

Forms are also available from the central office of the Fish and Wildlife Service at Washington 25, D. C. Completed application forms may be sent to the Washington office of the Service or to the field offices from which application forms were obtained.

Street addresses of the Fishery Market News Offices are as follows:

Boston, Mass., Rm. 10 Commonwealth Pier
New York, N. Y., 155 John Street
Hampton, Va., 18 S. King Street
New Orleans, La., Federal Building
San Pedro, Calif., Post Office Building
Seattle, Wash., 421 Bell Street Terminal
Chicago, Ill., Rm 618, 565 W. Washington Street
Gloucester, Mass., Post Office Building

The broad objective of the fisheries loan fund created by the Act is to provide financial assistance which will aid the commercial fishing industry to bring about a general upgrading of the condition of both fishing vessels and fishing gear in order to produce more efficient and profitable fishing operations.

TITLE 50—WILDLIFE

Chapter I—Fish and Wildlife Service, Department of the Interior

Subchapter J—Fisheries Loan Fund

PART 160—LOAN PROCEDURES

Basis and purpose. Section 4 of the Fish and Wildlife Act of 1956 (70 Stat. 1119, 1121), created a Fisheries Loan Fund to be used by the Secretary of the Interior under rules and regulations and under terms and conditions to be prescribed by him to make loans for financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels, and for research into the basic problems of fisheries. To implement the authorization thus granted, the following regulations, constituting a new subchapter and part, are adopted.

Sec.

160.1 Definitions of terms.
160.2 Purposes of loan fund.
160.3 Interpretation of loan authorization.
160.4 Qualified loan applicants.
160.5 Basic limitations.
160.6 Applications.
160.7 Processing of loan applications.
160.8 Approval of loans.
160.9 Interest.
160.10 Maturity.
160.11 Security.
160.12 Penalties on default.

AUTHORITY: §§ 160.1 to 160.12 issued under sec. 4, 70 Stat. 1121.

§ 160.1 *Definitions of terms.* For the purposes of this part, the following terms shall be construed, respectively, to mean and to include:

(a) *Secretary.* The Secretary of the Interior or his authorized representative.

(b) *Administrator.* Administrator of the Small Business Administration or his authorized representative.

(c) *Person.* Individual, association, partnership or corporation, any one or all, as the context requires.

(d) *State.* Any State, the Territories and possessions of the United States, the Commonwealth of Puerto Rico, and the District of Columbia.

§ 160.2 *Purposes of loan fund.* (a) Under section 4 of the Fish and Wildlife Act of 1956, the Secretary is authorized, among other things,

(1) To make loans for financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels, and for research into the basic problems of fisheries.

(2) Subject to the specific limitations in the section, to consent to the modification, with respect to the rate of interest, time of payment of any installment of principal, or security, of any loan contract to which he is a party.

The broad objective of the fisheries loan fund created by the Act is to provide financial assistance which will aid the commercial fishing industry to bring about a general upgrading of the condition of both fishing vessels and fishing gear thereby contributing to more efficient and profitable fishing operations.

(b) All financial assistance granted by the Secretary must be for one or more of the purposes set forth in paragraph (a) of this section.

§ 160.3 *Interpretation of loan authorization.* The terms used in the Act to describe the purposes for which loans may be granted are construed to be limited to the meanings ascribed in this section.

(a) *Operation of fishing gear and vessels.* The words "operation of fishing gear and vessels" mean and include all phases of activity directly associated with the capture or landing of fish.

(b) *Maintenance of fishing gear and vessels.* The words "maintenance of fishing gear and vessels" mean the normal and routine upkeep of all parts of fishing gear and fishing vessels, including machinery and equipment.

(c) *Replacement of fishing gear and vessels.* The words "replacement of fishing gear and vessels" contemplate the purchase of fishing gear or fishing vessels or any equipment, parts, machinery, or other items incident to outfitting for fishing to replace lost, damaged, worn, obsolete, inefficient, or discarded items of a similar nature.

(d) *Repair of fishing gear and vessels.* The words "repair of fishing gear and vessels" mean the restoration of any worn or damaged part of fishing gear or fishing vessels to an efficient operating condition.

(e) *Equipment of fishing gear and vessels.* The words "equipment of fishing gear and vessels" mean the parts, machinery, or other items incident to outfitting for fishing which are purchased for use in fishing operations.

(f) *Research into the basic problems of fisheries.* The words "research into the basic problems of fisheries" mean investigation or experimentation designed to lead to fundamental improvements in the capture or landing of fish conducted as an integral part of vessel or gear operations.

§ 160.4 *Qualified loan applicants.* (a) Any person residing or conducting business in any State shall be deemed to be a qualified applicant for financial assistance if—

(1) He owns a commercial fishing vessel of United States registry (if registration is required) used directly in the conduct of fishing operations, irrespective of the type, size, power, or other characteristics of such vessel;

(2) He owns any type of commercial fishing gear used directly in the capture of fish;

(3) He is directly engaged in commercial fishing operations using a fishing vessel of United States registry (if registration is required) or fishing gear under his control on a lease or share basis; or

(4) He owns or controls any property, equipment, or facilities useful in conducting research into the basic problems of fisheries or possesses scientific, technological, or other skills useful in conducting such research.

(b) Applications for financial assistance cannot be considered if the loan is to be used for—

(1) Any phase of a shore operation.

(2) Refinancing an existing loan made upon reasonable terms.

(3) Paying creditors for debts previously incurred (except where loans deemed to be based upon unreasonable terms are refinanced).

(4) Purchasing a partial interest in other fishing vessels or fishing gear or buying a partner's interest.

(5) Financing new business ventures involving fishing operations.

§ 160.5 *Basic limitations.* Applications for financial assistance may be considered only when there is evidence that the credit applied for is not otherwise available on reasonable terms. The financial assistance applied for shall be deemed to be otherwise available on reasonable terms, unless it is satisfactorily demonstrated that—

(a) Proof of refusal of the desired credit has been obtained from the applicant's bank of account: *Provided,* That if the amount of the loan applied for is in excess of the legal lending limit of the applicant's bank or in excess of the amount that the bank normally lends to any one borrower, then proof of refusal should be obtained from a correspondent bank or from any other lending institution whose lending capacity is adequate to cover the loan applied for. Proof of refusal of the credit applied for must contain the date, amount, and terms requested. Bank refusals to advance credit will not be considered the full test of unavailability of credit and, where there is knowledge or reason to believe that credit is otherwise available on reasonable terms from sources other than such banks, the credit applied for cannot be granted notwithstanding the receipt of written refusals from such banks.

(b) Other applicable Government financing is not available to the applicant.

§ 160.6 *Application.* Any person desiring financial assistance from the fisheries loan fund shall make application to the Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., on a loan application form furnished by that Service except that, in the discretion of the Secretary, an application made other than by use of the prescribed form may be considered if the application contains information deemed to be sufficient. Such application shall indicate the purposes for which the loan is to be used, the period of the loan, and the security to be offered.

§ 160.7 *Processing of loan applications.* If it is determined, on the basis of a preliminary review, that the application is complete and appears to be in conformity with established rules and procedures, a field examination shall be made. Following completion of the field investigation the application will be forwarded with an appropriate report to the Fish and Wildlife Service, Department of the Interior, Washington 25, D. C.

§ 160.8 *Approval of loans.* Loan agreements shall be executed on a form approved by the Secretary. The Secretary will evidence his approval of the loan by issuing a commitment order covering the terms and conditions for making the loan. Such commitment order shall be referred to the Administrator who will direct the closing of the loan with the applicant in the field and render services involving the collection of repayments and such other loan servicing functions as may be required. Any modification of the terms of a loan agreement following its execution must be agreed to in writing by the borrower and the Secretary.

§ 160.9 *Interest.* The rate of interest on all loans which may be granted is fixed at five per cent per annum.

§ 160.10 *Maturity.* The period of maturity of any loan which may be granted shall be determined and fixed according to the circumstances but in no event shall the date of maturity so fixed exceed a period of ten years.

§ 160.11 *Security.* Loans shall be approved only upon the furnishing of such security or other reasonable assurance of repayment as the Secretary may require.

§ 160.12 *Penalties on default.* Unless otherwise provided in the loan agreement, failure on the part of a borrower to conform to the terms of the loan agreement will be deemed grounds upon which the Secretary may cause any one or all of the following steps to be taken:

(a) Discontinue any further advances of funds contemplated by the loan agreement.

(b) Take possession of any or all collateral given as security and the property purchased with borrowed funds.

(c) Prosecute legal action against the borrower.

(d) Declare the entire amount advanced immediately due and payable.

(e) Prevent further disbursement of and withdraw any funds advanced to the borrower and remaining under his control.

These regulations shall become effective upon publication in the FEDERAL REGISTER.

Issued at Washington, D. C., and dated October 15, 1956.

FRED A. SEATON,
Secretary of the Interior.

* * * * *

INTERIOR AND SMALL BUSINESS ADMINISTRATION COOPERATE IN GRANTING FISHERY LOANS:

Secretary of the Interior Fred A. Seaton and Administrator of the Small Business Administration Wendell B. Barnes, announced October 25, 1956, that the two agencies have concluded an agreement for administration of the recently-established $10 million fisheries loan fund.

This loan fund was authorized by the Fish and Wildlife Act of 1956 and the regulations establishing the required administrative procedures were published in the Federal Register on October 18.

Under the terms of the "memorandum of understanding" signed by the two agencies, all completed loan applications must first be sent by the applicant to the Fish and Wildlife Service of the Department of the Interior, either to the nearest designated fishery field office or to the central office in Washington, D. C.

Applications approved for further processing will be forwarded by the Department to the Small Business Administration, which will initiate a field investigation to ascertain the applicant's financial standing. At the same time, the Service will determine the applicant's qualifications in the field of fisheries.

Loan applications approved by the Department of the Interior on the basis of investigations by the Small Business Administration and the Fish and Wildlife Service will be transmitted to the Small Business Administration, which will perform the services involving the issuance of the check for the loan, collection of repayments, and other loan servicing functions.

* * * * *

REVISED REGULATIONS ADOPTED FOR NEW ENGLAND HADDOCK FISHERY:

Revised regulations prescribing restrictions on trawling nets used in the taking of haddock in the Northwest Atlantic Ocean by persons under the jurisdiction of the United States have been adopted, the Department of the Interior announced on September 19, 1956.

The new regulations, effective October 26, 1956, authorize the U. S. Fish and Wildlife Service to issue registration certificates for vessels to be used in the taking of haddock within Subarea 5 of the Northwest Atlantic Ocean. These certificates will be issued by the Service's Regional Office in Boston, Mass.

Haddock

Subarea 5 is an area of the high seas lying off the coast of New England and

is one of five separately described areas of the high seas covered by the International Convention for the Northwest Atlantic Fisheries, signed at Washington, February 8, 1949.

Vessels registered for use in the haddock fishery will be required to use trawl nets having a minimum mesh size of $4\frac{1}{2}$ inches. As a result, possession of trawl nets with a mesh size less than $4\frac{1}{2}$ inches on vessels which must be so registered to participate in haddock fishing will be illegal, thus making more effective the enforcement of the restriction on mesh size. Prior to the new regulation, no registration to so identify boats engaged in haddock fishing was required.

The minimum mesh size restriction has been in effect since 1953. It was adopted in that year following a proposal by the 10-nation International Commission for the Northwest Atlantic Fisheries. Experience gained during three years of operations has indicated the desirability of effecting the change which will be helpful in obtaining industry-wide compliance with the requirements of the regulations.

For many years, prior to the adoption of the regulations, haddock fishermen using nets having an inside measurement as small as 2 inches caught haddock which were too small to be marketed. These small haddock were discarded at sea. The present regulations, based upon knowledge obtained through extensive research into the rates of growth and mortality of haddock, specifies a minimum mesh size of $4\frac{1}{2}$-inches inside measure which has the effect of permitting immature haddock to escape unharmed from the nets. Since adoption of the new fishing practices in 1953, biologists of the Fish and Wildlife Service estimate that several million pounds of young fish have been left in the sea each year for capture at a future time when they will have grown to a more desirable size.

By notice of proposed rule making published in the Federal Register on June 12, 1956, the public was invited to participate in the adoption of the proposed amendments to these regulations by submitting data, views, or arguments to the Director of the Fish and Wildlife Service within 30 days from the publication of the notice. Only one person sent in comments.

The revised regulations as published in the Federal Register of September 25, 1956, follow:

TITLE 50—WILDLIFE

Chapter I—Fish and Wildlife Service, Department of the Interior

Subchapter I—Northwest Atlantic Commercial Fisheries

PART 155—HADDOCK PROVISIONS

Experience gained since the initial adoption of regulations effective May 31, 1953 (18 F. R. 2414), prescribing restrictions on trawling nets used in the taking of haddock in the Northwest Atlantic Ocean, has demonstrated a need for further revisions in the regulations to make the same more effective.

In accordance with section 4 (a) of the Northwest Atlantic Fisheries Act of 1950, proposed amendments to the regulations were submitted to the Advisory Committee to the United States Commissioners on the International Commission of the Northwest Atlantic Fisheries on March 26, 1956, at which time the proposed revised regulations received the approval, in principle, of the Advisory Committee.

By notice of proposed rule making published on June 12, 1956 (21 F. R. 4015) the public was invited to participate in the adoption of proposed amendments to these regulations by submitting data, views, or arguments to the Director, Fish and Wildlife Service, Washington 25, D. C., within a period of thirty days from the publication of the notice. Consideration having been given to all pertinent data received in response to the notice, the regulations appearing below are adopted to replace Part 155—Haddock Provisions:

Sec.
155.1 Meaning of terms.
155.2 Haddock registration certificates.
155.3 Restrictions on fishing gear.
155.4 Temporary suspension of haddock registration certificates.
155.5 Certain persons and vessels exempted.

AUTHORITY: § 155.1 to 155.5 issued under sec. 7, 64 Stat. 1067; 16 U. S. C. 986.

§ 155.1 *Meaning of terms.* When used in the regulations in this part, unless the context otherwise requires, terms shall have the meanings ascribed hereinafter in this section.

(a) *Regulatory area.* The words "regulatory area" mean that portion of the Convention area, including all waters except territorial waters, bounded by a line beginning at the terminus of the international boundary between the United States of America and Canada in Grand Manan Channel at a point in 44°46'35.34" north latitude, 66°54'11.23" west longitude; thence due south to the parallel of 43°50' north latitude; thence due west to the Meridian of 67°40' west longitude; thence due south to the parallel of 42°20' north latitude; thence due east to a point in 66° west longitude; thence along a rhumb line in a southeasterly direction to a point in 42° north latitude 65°40' west longitude; thence due south to the parallel of 39° north latitude; thence due west to the Meridian of 71°40' west longitude; thence due north to a point three miles off the coast of the State of Rhode Island; thence along the coasts of Rhode Island, Massachusetts, New Hampshire, and Maine at a distance of three miles to the point of beginning.

(b) *Haddock.* The word "haddock" denotes any fish of the species Melanogrammus aeglefinus.

(c) *Haddock fishing.* The words "haddock fishing" mean and include (1) the catching, taking or fishing for or the attempted catching, taking or fishing for fish of the species Melanogrammus aeglefinus; and (2) the outfitting and depar-

ture of a vessel for or the return of a vessel from haddock fishing.

(d) *Fishing vessel.* The words "fishing vessel" denote every kind, type or description of watercraft or vessel subject to the jurisdiction of the United States used in or outfitted for catching or processing fish or transporting fish from fishing grounds.

(e) *Trawl net.* The words "trawl net" means any large bag net dragged in the sea by a vessel or vessels for the purpose of taking fish.

(f) *Cod end.* The words "cod end" mean the bag-like extension attached to the after end of the belly of the trawl net and used to retain the catch.

§ 155.2 *Haddock registration certificates.* (a) After the fifteenth day following the effective date of this part, no person shall engage in haddock fishing within the regulatory area nor shall any person possess, transport or deliver by means of any fishing vessel haddock taken within such area except under a haddock registration certificate issued and in force in conformity with the regulations in this part.

(b) The owner or operator of a fishing vessel may obtain without charge a haddock registration certificate by furnishing, on a form to be supplied by the Fish and Wildlife Service, information specifying the names and addresses of the owner and operator of the vessel, the name, official number and home port of the vessel, and the period for which the haddock registration certificate is desired. The form shall be submitted, in duplicate, to the Regional Director, Fish and Wildlife Service, Department of the Interior, Boston, Massachusetts, who shall grant the registration certificate for the duration specified by the applicant in the form but in no event to extend beyond the end of the calendar year during which the registration certificate is issued. New registration certificates shall similarly be issued to replace expired, lost or mutilated certificates. An application for replacement of an expiring registration certificate shall be made in like manner as the original application not later than ten days prior to the expiration date of the expiring certificate.

(c) The haddock registration certificate so issued by the Fish and Wildlife Service shall be carried on board the vessel for which it is issued at all times and such certificate, the vessel, its gear and equipment shall at all times be subject to inspection by officers authorized to enforce the regulations in this part.

§ 155.3 *Restrictions on fishing gear.* (a) No person shall possess at any time on board a vessel for which a haddock registration certificate is in force, or use or attempt to use from such vessel, a trawl net or nets, parts of nets or netting having a mesh size of less than four and one-half inches as defined in this section.

(b) As used in this section, the term "mesh size of less than four and one-half inches" shall mean (1) with respect to any part of the net except the cod end, the average size of any twenty consecutive meshes in any row located at least ten meshes from the side lacings measured when wet after use; and (2) with respect to the cod end, the average size of any row of meshes running the length of the cod end located at least ten meshes from the side lacings, measured when wet after use, or, at the option of the user, a cod end which has been approved, in accordance with paragraph (d) of this section, by an authorized employee of the Fish and Wildlife Service, as having a mesh size when dry before use equivalent to not less than four and one-half inches when wet after use.

(c) All measurements of meshes when wet after use shall be made by the insertion into such meshes under pressure of not less than ten nor more than fifteen pounds of a flat wedge-shaped gauge having a taper of two inches in nine inches and a thickness of three thirty-seconds of an inch.

(d) For the purpose of approving dry cod ends before use, as contemplated by paragraph (b) of this section, the average mesh size of such cod ends shall be determined by measuring the length of any single row of meshes running the length of the cod end, parallel to the long axis of the cod end and located at least ten meshes from the side lacings, when stretched under a tension of two hundred pounds, and dividing the length by the number of meshes in such row: *Provided*, That not more than ten percent of the meshes in such row shall be more than one-half inch smaller when measured between knot centers than the average of the row. Cod ends so measured which are constructed of the twines and are of not less than the average mesh sizes specified in the table below may be approved for haddock fishing by any authorized employee of the Fish and Wildlife Service by the attachment to such cod end of an appropriate seal.

Twine	*Average mesh size*
4-ply 45-yard manila, double strand.	5.625 inches (5⅝").
4-ply 50-yard manila, double strand.	5.625 inches (5⅝").
4-ply 75-yard manila, double strand.	5.625 inches (5⅝").
4-ply 80-yard manila, double strand.	5.500 inches (5½").
120-thread cotton.	4.250 inches (4¼").

(e) The alteration, defacement or reuse of any seal affixed to a cod end in accordance with this section is prohibited.

(f) The repair, alteration or other modification of a cod end to which a seal has been affixed in accordance with this section shall invalidate such seal and such cod end shall not thereafter be deemed to be approved for haddock fishing. Nothing contained in this paragraph shall preclude the continued use at the option of the user, of a cod end having an invalidated seal affixed thereto: *Provided*, That such cod end after repair, alteration or other modification shall continue to have a mesh size of not less than four and one-half inches as defined in paragraph (b) of this section.

(g) The use in haddock fishing within the regulatory area of any device or method which will obstruct the meshes of the trawl net or which otherwise will have the effect of diminishing the size of said meshes is prohibited: *Provided*, That a protective covering may be attached to the underside only of the cod end alone of the net to reduce and prevent damage thereto.

§ 155.4 *Temporary suspension of haddock registration certificates.* (a) The owner or operator of any fishing vessel which is proposed to be used in haddock fishing beyond the limits of the regulatory area or is proposed to be used in fishing within such area for species of fish other than haddock, may obtain a temporary suspension of the haddock registration certificate issued for such vessel for the specified period during which such nonregulated fishing is to be conducted.

(b) Temporary suspension of haddock registration certificates shall be granted upon oral or written request, specifying the period of suspension desired, by an authorized officer of one of the following agencies: Fish and Wildlife Service, Coast Guard, Bureau of Customs, and Post Office Department, and by an authorized officer of the States of Maine and Massachusetts. Such officer shall make appropriate endorsement on the certificate evidencing the duration of its suspension.

§ 155.5 *Certain persons and vessels exempted.* Nothing contained in the regulations in this part shall apply to:

(a) Any person who or vessel which, in the course of taking fish other than haddock, takes and possesses a quantity of haddock not exceeding five thousand pounds, or ten percent of all fish on the vessel from which the fishing is conducted, whichever is the greater.

(b) Any person or vessel authorized by the Director of the Fish and Wildlife Service to engage in haddock fishing for scientific purposes.

(c) Any vessel documented as a common carrier by the Government of the United States and engaged exclusively in the carriage of freight and passengers.

These regulations shall become effective 30 days after publication in the FEDERAL REGISTER.

Dated: September 18, 1956.

FRED G. AANDAHL,
Acting Secretary of the Interior.

Tariff Commission

"ESCAPE CLAUSE" REPORT ON GROUNDFISH FILLETS RELEASED:

The Tariff Commission on October 12 submitted a report to the President on its findings and recommendation in the "escape clause" investigation No. 47 made under section 7 of the Trade Agreements Extension Act of 1951, as amended, with respect to groundfish fillets. Such fillets (include frozen fillet blocks or slabs used for making fish steaks) are subject to duty at rates imposed under paragraph 717(b) of the Tariff Act of 1930, as modified pursuant to a tariff concession granted in the General Agreement on Tariffs and Trade on January 1, 1948. Under that agreement, the duty is 1-7/8 cents per pound on an annual quota equal to whichever of the two following amounts is the larger: (1) 15 million pounds, or (2) 15 percent of the average annual United States consumption of such fish fillets in the three preceding calendar years. Imports in excess of that quota are dutiable at 2-1/2 cents a pound, which is the rate of duty originally provided for all imports of groundfish fillets in paragraph 717(b) of the Tariff Act of 1930. Paragraph 717(b) covers "cod, haddock, hake, pollock, cusk, and rosefish, fresh or frozen (whether or not packed in ice), all the foregoing , filleted, skinned, boned, sliced, or divided into portions."

The Commission unanimously found that, as a result in part of the customs treatment reflecting the aforementioned concession, groundfish fillets are being imported into the United States in such increased quantities, both actual and relative, as to cause serious injury to the domestic industry producing like or directly competitive products. The Commission also found that in order to remedy this serious injury, it is necessary that the duty on the imports that enter under the tariff quota be increased from 1-7/8 cents a pound to 2.8125 cents a pound, and that the duty on the imports that enter in excess of that quota be increased from 2-1/2 cents a pound to 3.75 cents a pound.

The Commission's report contains a brief summary of the information assembled in the investigation and also a statistical appendix.

The conclusions arrived at by the Commission were:

"...the domestic industry producing groundfish fillets has been in serious difficulty during the past several years. Its distress stems from a number of causes, but for the purposes of this investigation the Commission needs to consider only whether increased imports, either actual or relative to domestic production, "have contributed substantially towards causing or threatening serious injury to such industry." ... .

"The statistics... indicate

"(1) that imports of groundfish fillets have increased almost continuously from 9 million pounds in 1939 to 88 million pounds in 1951, and to 128 million pounds in 1955;

"(2) that the increase in imports has occurred in all major types and forms of groundfish fillets;

"(3) that United States production of groundfish fillets rose from 100 million pounds in 1939 to 149 million pounds in 1951, and thereafter declined irregularly to 106 million pounds in 1955;

"(4) that cold-storage holdings of frozen groundfish fillets in recent years have recurrently been at such high levels as to have a depressing effect on the prices of groundfish fillets;

"(5) that United States consumption of groundfish fillets rose from 106 million pounds in 1939 to 244 million pounds (inclusive of 53 million pounds of frozen slabs) in 1955;

"(6) that the share of the domestic market supplied by the domestic producers of groundfish fillets declined from 95 percent in 1939 to 62 percent in 1951, to 51 percent in 1954, and to 43 percent in 1955;

"(7) that average prices received by processors for groundfish fillets have declined sharply but irregularly from the near-record levels of 1951 (output in 1955 was 29 percent less than in 1951 and only 5 percent above that in 1939);

"(8) that employment in domestic filleting plants has followed the same general trend as the volume of domestic output of groundfish fillets;

"(9) that wage rates in filleting plants have increased during the past several years but not as rapidly as those in other manufacturing industries in the Boston area;

"(10) that, on the basis of sampling, the domestic concerns that fillet groundfish, in the aggregate, have sustained operating losses in all recent years;

"(11) that about 95 percent of the United States catch of groundfish is landed by New England's groundfish-fishing fleet, which consists almost wholly of large and medium trawlers;

"(12) that currently more than 80 percent of the landings of groundfish in New England ports are used by primary processors there for conversion into fillets and slabs, and that in most of those ports the only important buyers of groundfish are the filleting plants;

"(13) that ex-vessel prices for groundfish rose considerably between 1939 and the period 1951-52, and have declined irregularly but substantially since then;

"(14) that largely because of the impact of severe competition from imported groundfish fillets, the size of the New England groundfish-fishing fleet has declined;

"(15) that the total number of job opportunities for groundfish fishermen in New England increased between 1944 and 1947, but since then has declined substantially--largely because of the reduction in the size of the fleet;

"(16) that average dollar earnings of fishermen engaged in groundfish fishing declined sharply between 1951 (when earnings were at their highest in recent years) and 1953, but rose in the following 2

years to a level only slightly higher than that which prevailed in 1953;

"(17) that average dollar earnings of fishermen in recent years have not advanced as rapidly as those of factory workers in the Boston area, and that the purchasing power of groundfish fishermen's incomes declined by an average of 23 percent between 1950 and 1955; and

"(18) that, on the basis of sampling, the owners of the domestic groundfish-fishing fleet, in the aggregate, have been operating at a loss in all recent years.

"On the basis of the facts outlined above, the Commission finds that increased imports of groundfish fillets have contributed substantially towards causing serious injury to the domestic industry producing groundfish fillets. Further, the Commission is of the opinion that as long as this industry continues to be confronted with competition from imported groundfish fillets as severe as has prevailed during the past several years, it has little prospect of extricating itself from the complex of problems that confront it. Under existing conditions of competition from imports, vessel owners have little or no incentive even to replace old or lost vessels with new ones--much less to make additions to their fleets. Indeed, some owners have already sold their vessels, and others have transferred vessels to fishing ventures in other waters and even under other flags. Continued shrinkage in the size of the fleet lessens job opportunities for fishermen, reduces the size of their annual catch of fish, and lowers the scale of filleting operations which in turn results in lessened employment, reduced earnings, and lower profits in filleting plants. The impact of such a chain of events is particularly disturbing to the major New England port cities whose economies are so heavily dependent upon maintenance of a healthy industry for producing groundfish fillets.

"The Commission believes that the application of the increased rates of duty here recommended will prevent the serious injury now being experienced by the domestic industry because of the severity of competition from imported groundfish fillets, and that these increases in duty, together with the benefits that the industry may expect from recently enacted legislation (Public Laws 1024 and 1027, 84th Congress) should enable it to deal effectively with its over-all problems.

"The Commission believes that the rates of duty that it here recommends (in accordance with the requirements of section 7 of the Trade Agreements Extension Act of 1951, as amended), are the lowest that will afford relief from serious injury to the domestic groundfish-fishing and filleting industry."

PEARL ESSENCE

Pearl essence is made by several different processes which involve the removal of the guanin crystals from the scales of fish. These crystals are deposited in the epidermis of the scales and give them their luster. After processing this luster is imparted to beads of glass or other objects in the manufacture of artificial pearls.

The herring, Clupea harengus, caught along the North Atlantic coast has provided much of the raw material for this trade. Recently pearl essence has been produced from herring scales from the Pacific British Columbia herring fishery. One hundred tons of fish are reported to produce one ton of scales, which produces one pound of essence.

--"Sea Secrets," The Marine Laboratory, University of Miami, Coral Gables, Fla.

□□□□□□

Editorial Assistant--Ruth V. Keefe Illustrator--Gustaf T. Sundstrom

Compositors--Jean Zalevsky, Alma Greene, and Helen Joswick

* * * * *

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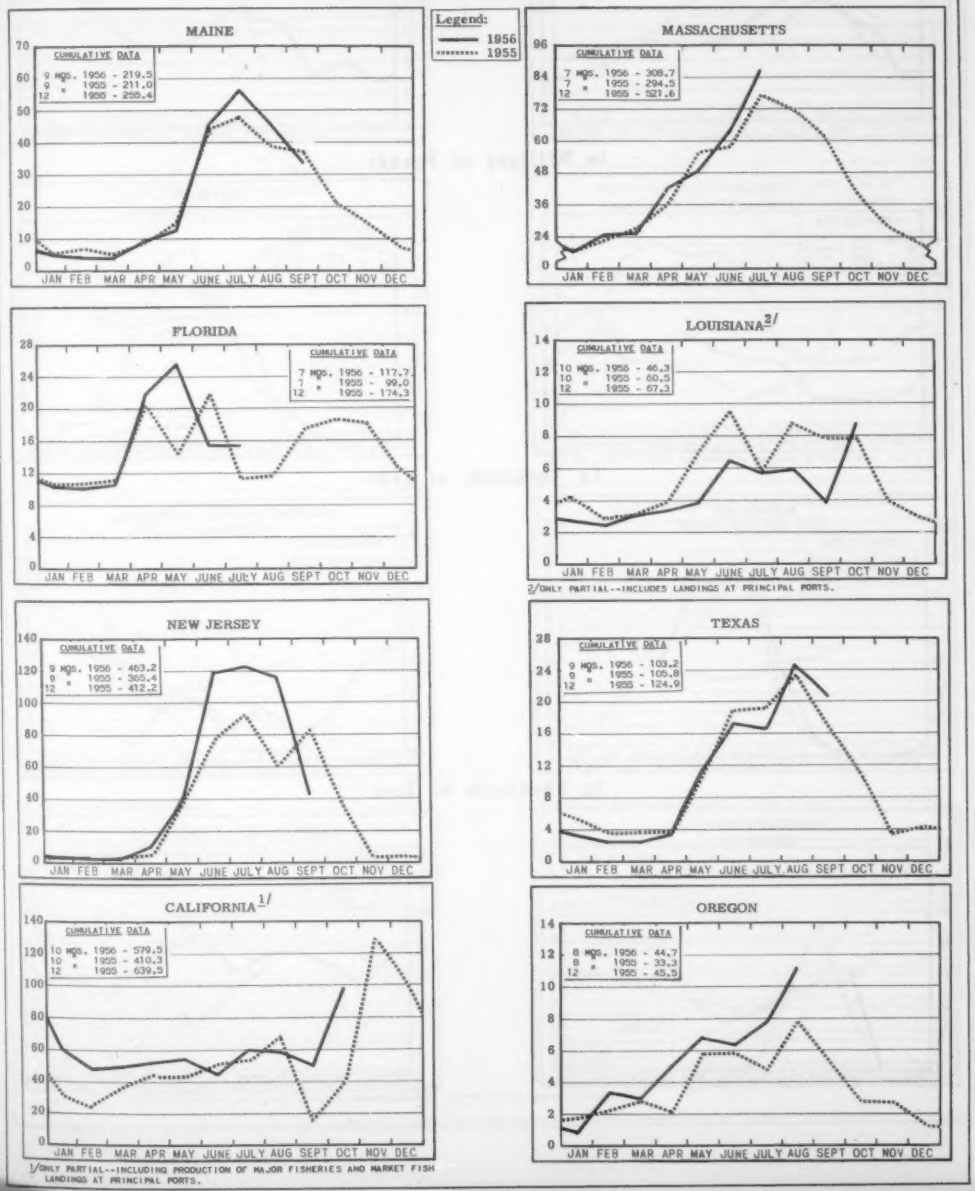
FISHERY INDICATORS

CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

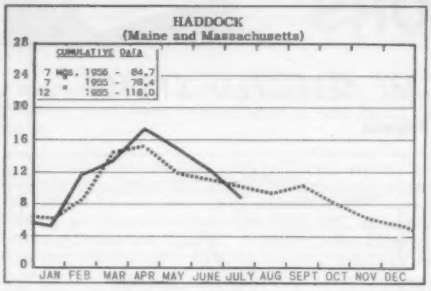


2/ONLY PARTIAL--INCLUDES LANDINGS AT PRINCIPAL PORTS.

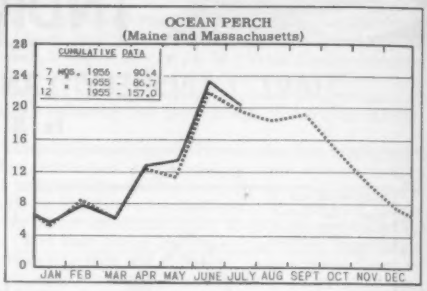
1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

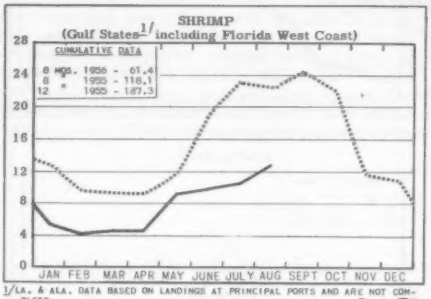
In Millions of Pounds


HADDOCK
(Maine and Massachusetts)
CUMULATIVE DATA
7 MOS. 1956 - 84.7
7 " 1955 - 78.4
12 " 1955 - 118.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

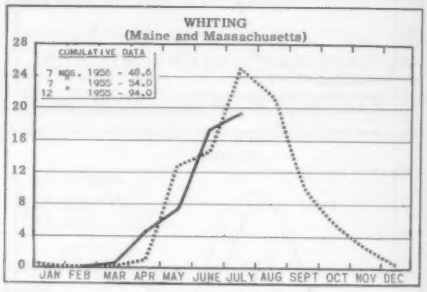
Legend:
1956
1955


OCEAN PERCH
(Maine and Massachusetts)
CUMULATIVE DATA
7 MOS. 1956 - 90.4
7 " 1955 - 86.7
12 " 1955 - 157.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

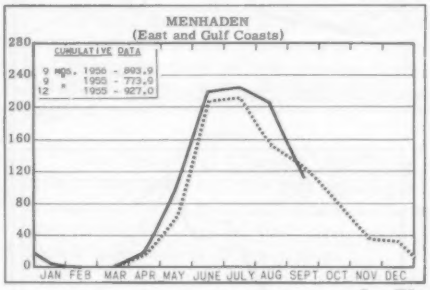
In Millions of Pounds

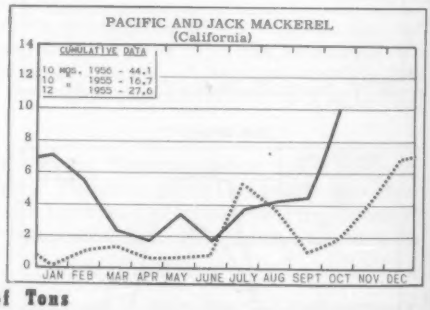

SHRIMP
(Gulf States 1/ including Florida West Coast)
CUMULATIVE DATA
8 MOS. 1956 - 61.4
8 " 1955 - 116.1
12 " 1955 - 187.3
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

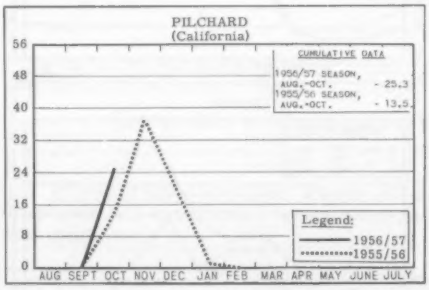

WHITING
(Maine and Massachusetts)
CUMULATIVE DATA
7 MOS. 1956 - 48.6
7 " 1955 - 34.0
12 " 1955 - 94.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

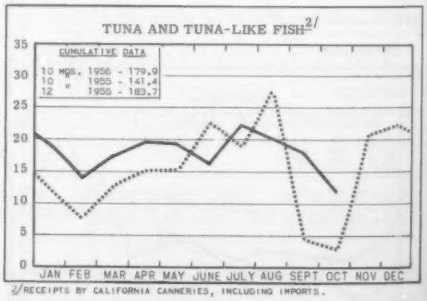
In Thousands of Tons


MENHADEN
(East and Gulf Coasts)
CUMULATIVE DATA
9 MOS. 1956 - 893.9
9 " 1955 - 773.0
12 " 1955 - 927.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC


PACIFIC AND JACK MACKEREL
(California)
CUMULATIVE DATA
10 MOS. 1956 - 44.1
10 " 1955 - 16.7
12 " 1955 - 27.6
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

In Thousands of Tons

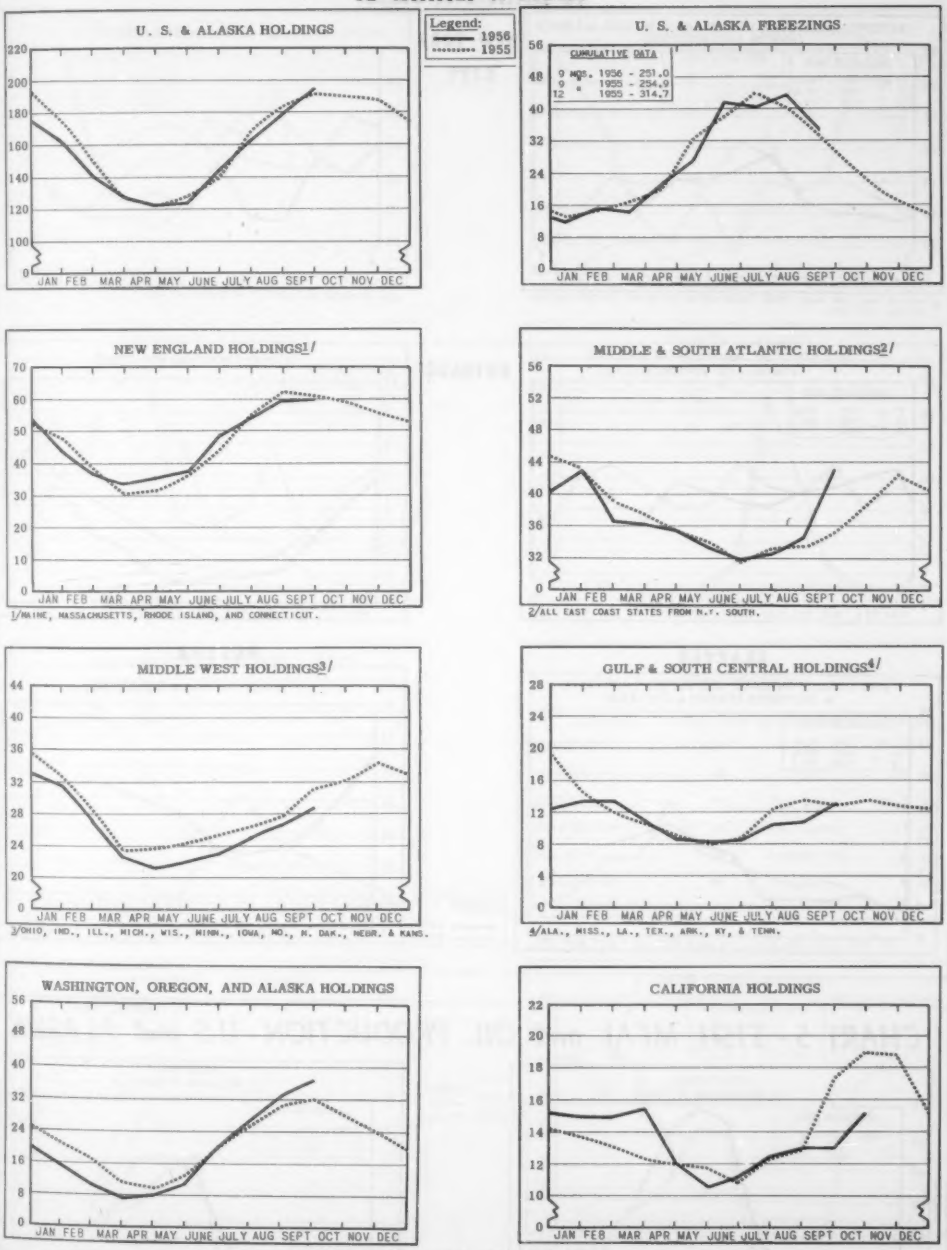



TUNA AND TUNA-LIKE FISH 2/
CUMULATIVE DATA
10 MOS. 1956 - 179.9
10 " 1955 - 141.4
12 " 1955 - 183.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

2/RECEIPTS BY CALIFORNIA CANNERIES, INCLUDING IMPORTS.

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds


U. S. & ALASKA HOLDINGS
Legend:
1956
1955
U. S. & ALASKA FREEZINGS
CUMULATIVE DATA
9 MOS. 1956 - 251.0
9 " 1955 - 254.9
12 1955 - 314.7
NEW ENGLAND HOLDINGS1/
MIDDLE & SOUTH ATLANTIC HOLDINGS2/
MIDDLE WEST HOLDINGS3/
GULF & SOUTH CENTRAL HOLDINGS4/
WASHINGTON, OREGON, AND ALASKA HOLDINGS
CALIFORNIA HOLDINGS
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT.

2/ALL EAST COAST STATES FROM N.Y. SOUTH.

3/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR. & KANS.

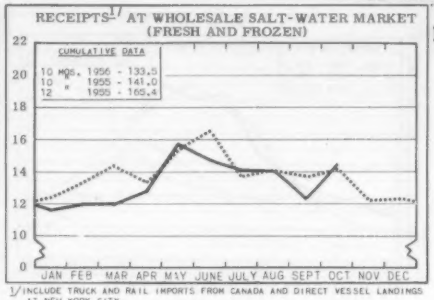
4/ALA., MISS., LA., TEX., ARK., KY, & TENN.

*Excludes salted, cured, and smoked products.

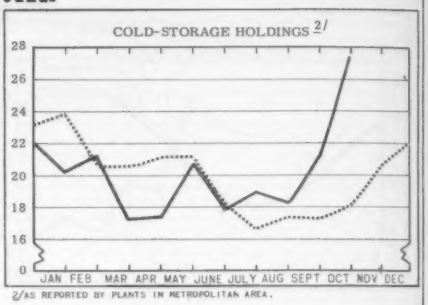
CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

NEW YORK CITY

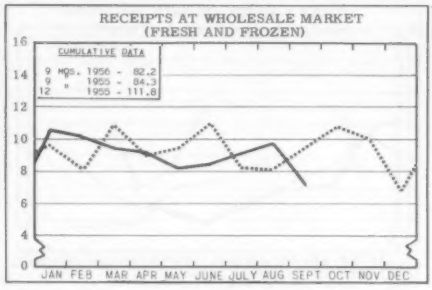

RECEIPTS 1/ AT WHOLESALE SALT-WATER MARKET (FRESH AND FROZEN)
CUMULATIVE DATA
10 MOS. 1956 - 133.5
10 " 1955 - 141.0
12 " 1955 - 165.4
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

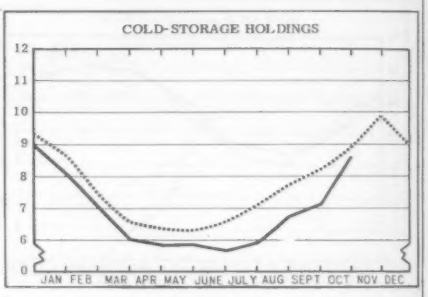
1/INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.



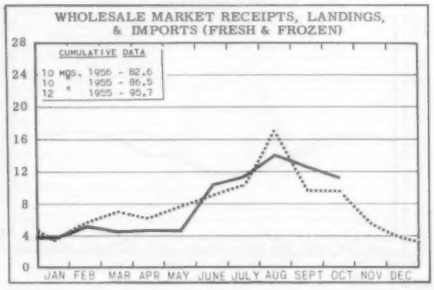
2/AS REPORTED BY PLANTS IN METROPOLITAN AREA.

CHICAGO

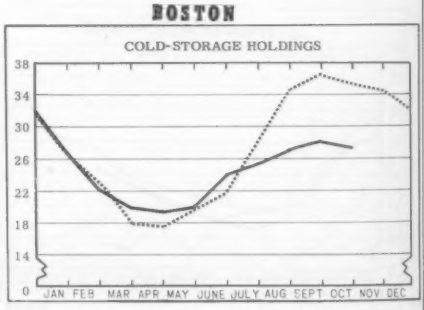

RECEIPTS AT WHOLESALE MARKET (FRESH AND FROZEN)
CUMULATIVE DATA
9 MOS. 1956 - 82.2
9 " 1955 - 84.3
12 " 1955 - 111.8
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC



SEATTLE

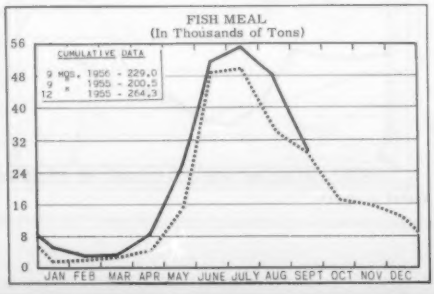

WHOLESALE MARKET RECEIPTS, LANDINGS, & IMPORTS (FRESH & FROZEN)
CUMULATIVE DATA
10 MOS. 1956 - 82.6
10 " 1955 - 86.5
12 " 1955 - 95.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

BOSTON



Legend:
1956
1955

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA


FISH MEAL
(In Thousands of Tons)
CUMULATIVE DATA
9 MOS. 1956 - 229.0
9 " 1955 - 200.5
12 " 1955 - 264.3
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

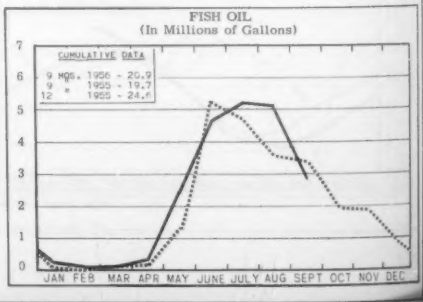
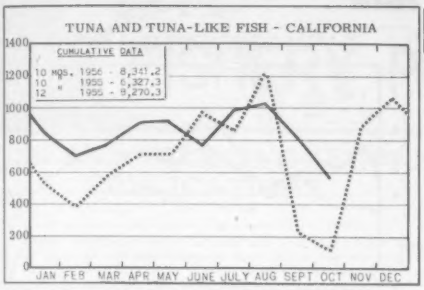
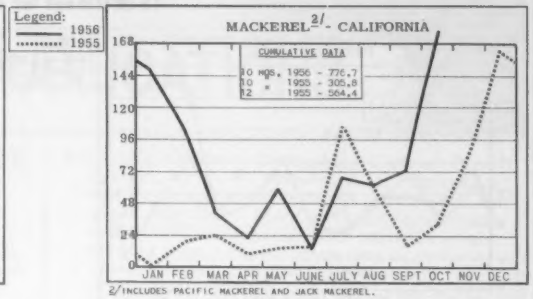

FISH OIL
(In Millions of Gallons)
CUMULATIVE DATA
9 MOS. 1956 - 20.9
9 " 1955 - 19.7
12 " 1955 - 24.6
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

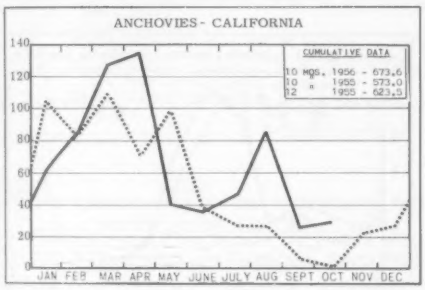
In Thousands of Standard Cases

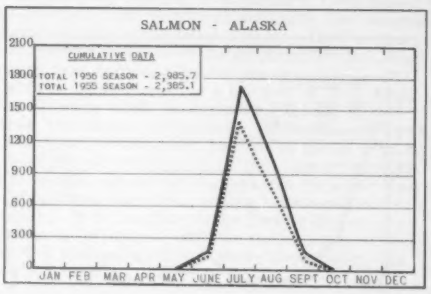

TUNA AND TUNA-LIKE FISH - CALIFORNIA
CUMULATIVE DATA
10 MOS. 1956 - 8,341.2
10 " 1955 - 6,327.3
12 " 1955 - 9,270.3
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

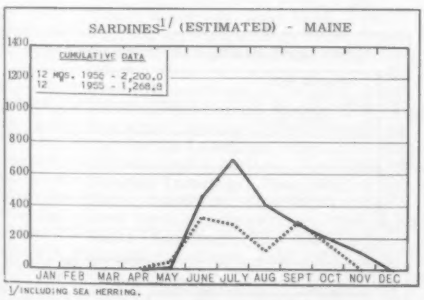


MACKEREL 2/ - CALIFORNIA
CUMULATIVE DATA
10 MOS. 1956 - 776.7
10 " 1955 - 305.8
12 " 1955 - 564.4
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

2/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.


ANCHOVIES - CALIFORNIA
CUMULATIVE DATA
10 MOS. 1956 - 673.6
10 " 1955 - 573.0
12 " 1955 - 623.5
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

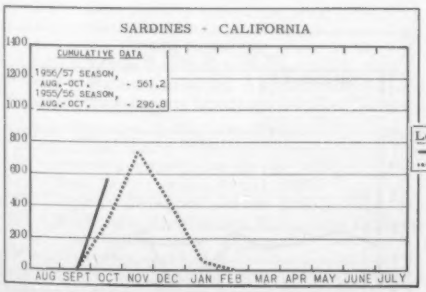

SALMON - ALASKA
CUMULATIVE DATA
TOTAL 1956 SEASON - 2,985.7
TOTAL 1955 SEASON - 2,385.1
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

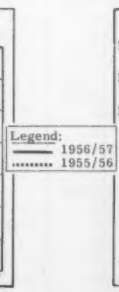

SARDINES 1/ (ESTIMATED) - MAINE
CUMULATIVE DATA
12 MOS. 1956 - 2,200.0
12 " 1955 - 1,268.8
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Can Designation	Net Wgt.
SARDINES	100	¼ drawn	3¾ oz.
SHRIMP.....	48	--	5 oz.
TUNA	48	No. ½ tuna	6 & 7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
SALMON	48	1-pound tall	16 oz.
ANCHOVIES	48	½ lb.	8 oz.


SARDINES - CALIFORNIA
CUMULATIVE DATA
1956/57 SEASON, AUG.-OCT. - 561.2
1955/56 SEASON, AUG.-OCT. - 296.8
AUG SEPT OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY



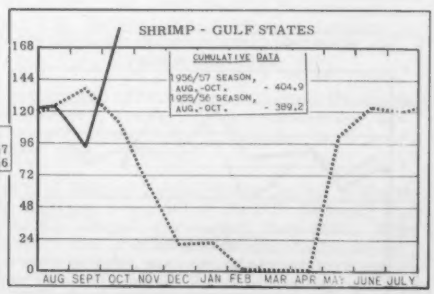
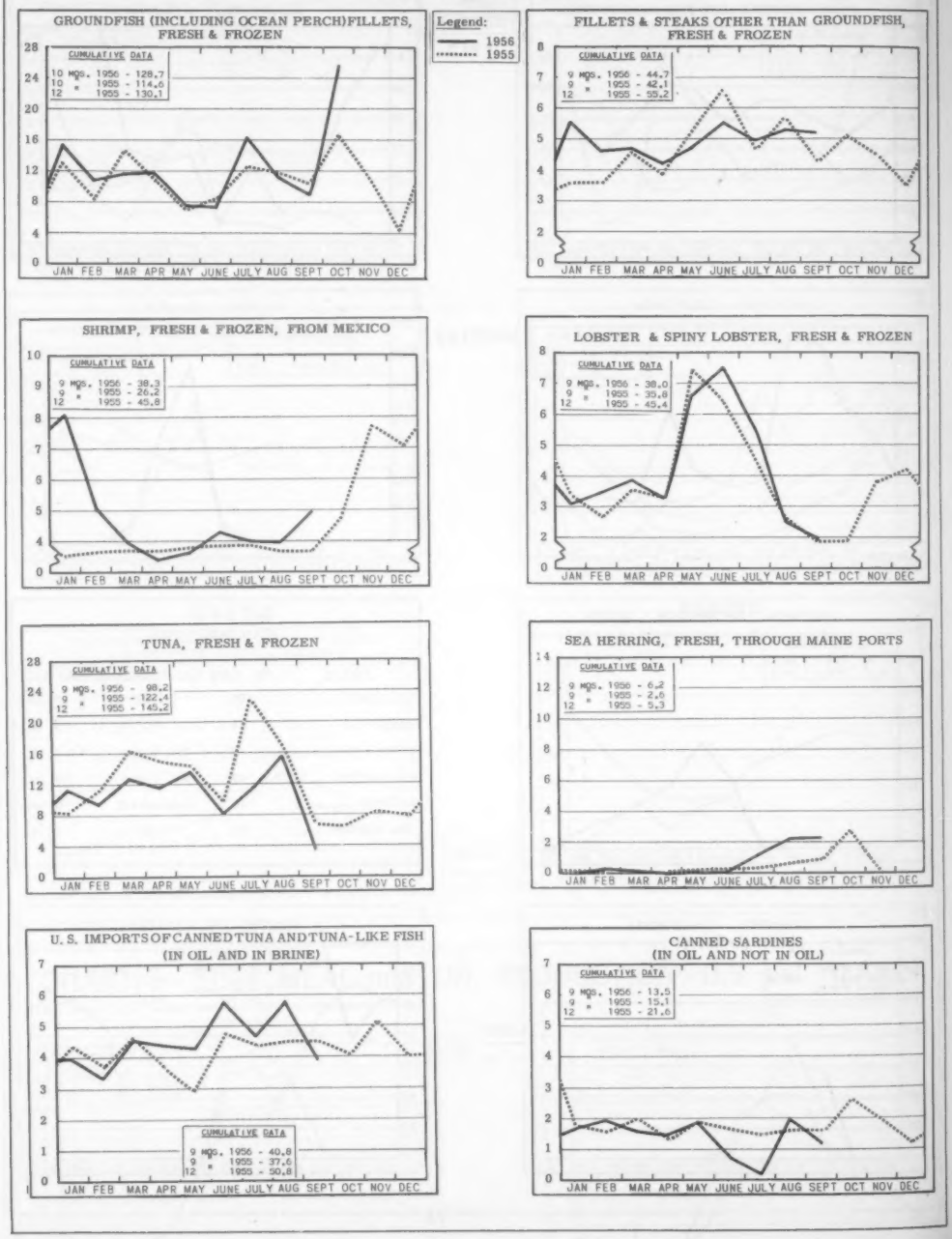
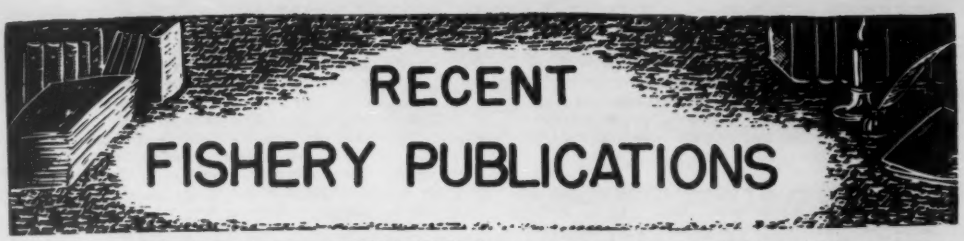

SHRIMP - GULF STATES
CUMULATIVE DATA
1956/57 SEASON, AUG.-OCT. - 404.9
1955/56 SEASON, AUG.-OCT. - 389.2
AUG SEPT OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY

CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds


GROUNDFISH (INCLUDING OCEAN PERCH) FILLETS, FRESH & FROZEN
CUMULATIVE DATA
10 MOS. 1956 - 128.7
10 " 1955 - 114.6
12 " 1955 - 130.1
Legend:
1956
1955
FILLETS & STEAKS OTHER THAN GROUNDFISH, FRESH & FROZEN
CUMULATIVE DATA
9 MOS. 1956 - 44.7
9 " 1955 - 42.1
12 " 1955 - 55.2
SHRIMP, FRESH & FROZEN, FROM MEXICO
CUMULATIVE DATA
9 MOS. 1956 - 38.3
9 " 1955 - 26.2
12 " 1955 - 45.8
LOBSTER & SPINY LOBSTER, FRESH & FROZEN
CUMULATIVE DATA
9 MOS. 1956 - 38.0
9 " 1955 - 39.8
12 " 1955 - 45.4
TUNA, FRESH & FROZEN
CUMULATIVE DATA
9 MOS. 1956 - 98.2
9 " 1955 - 122.4
12 " 1955 - 145.2
SEA HERRING, FRESH, THROUGH MAINE PORTS
CUMULATIVE DATA
9 MOS. 1956 - 6.2
9 " 1955 - 2.6
12 " 1955 - 5.3
U. S. IMPORTS OF CANNED TUNA AND TUNA-LIKE FISH (IN OIL AND IN BRINE)
CUMULATIVE DATA
9 MOS. 1956 - 40.8
9 " 1955 - 37.6
12 " 1955 - 50.8
CANNED SARDINES (IN OIL AND NOT IN OIL)
CUMULATIVE DATA
9 MOS. 1956 - 13.5
9 " 1955 - 15.1
12 " 1955 - 21.6
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR. - FISH - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number — Title

CFS-1357 - Manufactured Fishery Products, 1954 Annual Summary, 7 pp.
CFS-1389 - Frozen Fish Report, July 1956, 8 pp.
CFS-1390 - Massachusetts Landings, April 1956, 5 pp.
CFS-1397 - Fish Meal and Oil, July 1956, 2 pp.
CFS-1398 - Ohio Landings, July 1956, 3 pp.
CFS-1399 - Texas Landings, July 1956, 3 pp.
CFS-1400 - Florida Landings, May 1956, 6 pp.
CFS-1401 - North Carolina Landings, July 1956, 2 pp.
CFS-1402 - Georgia Landings, July 1956, 2 pp.
CFS-1403 - Frozen Fish Report, August 1956, 8 pp.
CFS-1404 - Alabama Landings, June 1956, 4 pp.
CFS-1405 - California Landings, May 1956, 4 pp.
CFS-1406 - Mississippi Landings, June 1956, 2 pp.
CFS-1407 - Florida Landings, June 1956, 6 pp.
CFS-1408 - Maine Landings, July 1956, 3 pp.
CFS-1409 - New York Landings, July 1956, 4 pp.
CFS-1410 - Mass. Landings, May 1956, 5 pp.
CFS-1411 - Shrimp Landings, July 1956, 4 pp.
CFS-1412 - Fish Meal and Oil, August 1956, 2 pp.
CFS-1414 - Ohio Landings, August 1956, 2 pp.
CFS-1415 - Alabama Landings, July 1956, 3 pp.
CFS-1417 - New Jersey Landings, July 1956, 4 pp.
CFS-1418 - Georgia Landings, August 1956, 2 pp.
CFS-1419 - California Landings, June 1956, 4 pp.
CFS-1420 - Texas Landings, August 1956, 3 pp.
CFS-1423 - Maine Landings, August 1956, 3 pp.
CFS-1424 - New Jersey Landings, August 1956, 4 pp.

Wholesale Dealers in Fishery Products (Revised):
SL-27 - Indiana (Lake Michigan Area), 1956, 1 p.
SL-30 - Pennsylvania (Lake Erie), 1956, 1 p.
SL-31 - New York (Lakes Area), 1956, 2 pp.
SL-37 - Kansas (Missouri River Area), 1956, 1 p.
SL-38 - Missouri (Mississippi River and Tributaries Area), 1956, 2 pp.
SL-42 - Kentucky, 1956, 1 p.
SL-44 - Nebraska (Missouri River Area), 1956, 1 p.

FL - 232 - Fishery Technology Abstract Card System, by M. E. Stansby, K. L. Osterhaug, and F. Bruce Sanford, 39 pp., processed, revised July 1956. Since 1943 the Service has maintained a comprehensive card file of abstracts from articles appearing in current literature pertaining to fishery technology. Sources of information being abstracted consist of about 70 periodicals dealing with fishery, food, general scientific, and technical subjects, and include Chemical Abstracts from January 1943 to the present. In addition to the material accumulated during this period, a miscellaneous group of abstract cards covering a portion of this field, from 1930 to 1943, is included. About 19,000 cards are on file at present. Since January 1948, the abstracts have been published in the monthly periodical Commercial Fisheries Abstracts. This leaflet describes the system used for classifying these cards according to the subject matter. It is similar to the Dewey Decimal system in principal, but the entire range of values 0-9 was adapted to fishery technology and related subjects.

SSR-Fish. No. 176 - English Translations of Fishery Literature, Further Listings, compiled by Leslie W. Scattergood, 33 pp., processed, July 1956. This report is a continuation of a series which was initiated to provide fishery investigators with information on the amount and availability of English translations of fishery literature. The first two sections of this series were issued by the Washington Department of Fisheries, Smith Tower Bldg., Seattle 4, Wash. The third and fourth reports were published by the Service as "Special Scientific Report--Fisheries Nos. 35 and 72."

SSR-Fish. No. 177 - Zooplankton Volumes off the Pacific Coast, 1955, 35 pp., processed, August 1956.

SSR-Fish. No. 180 - Mid-Pacific Oceanography, Part VIII, Middle Latitude Waters, January-March 1954, by James W. McGary and E. D. Stroup, 178 pp., processed, June 1956.

This is Cortland (Fish-Cultural Station, Experimental Hatchery, Trout-Nutrition Laboratory, In-Service Training School), Circular 42, 2 pp., folder, illus., printed.

Glossary of Marine Conservation Terms in English and Russian, compiled by Paul S. Galtsoff, Circular 43, 130 pp., processed, June 1956. This glossary was prepared primarily to facilitate the work of interpreters and translators assigned to international conferences dealing with the

problems of utilization and conservation of living resources of the sea. It is not a dictionary in the ordinary sense of the word, for it comprises primarily the terms and expressions which have special meaning to conservationists, biologists, statisticians, and oceanographers. A few parliamentary and legal expressions which usually appear in international treaties are also included.

(Alaska) Commercial Fisheries Regulations Amendments, Amendments Nos. 1 to 18 to Regulatory Announcement No. 48, 8 pp., processed, 1956.

Sep. No. 450 - Georges Bank Haddock Fishery--Changes in Scrod Abundance in Recent Years.
Sep. No. 451 - Bleeding and Heat Death in the Southern Oyster.
Sep. No. 452 - New Diving Sled.
Sep. No. 453 - Research in Service Laboratories (October 1956): Contains these short articles--"Experimental Fish Meal Dryer;" "Experimental Bulk Ocean Shipments of Alaska Herring Meal;" "Processing Studies on Menhaden Meal;" "Converting Fish Scales into Animal Food;" "Salmon Waste as Bait;" "Breaded Shrimp Interim Federal Specification."

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED IN THE REVIEW.

Production of Fishery Products in Selected Areas of Virginia, Maryland, and North Carolina (As Reported to Hampton Fishery Market News Office), 1955, by William N. Kelly, 40 pp., processed, 1956. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 18 South King St., Hampton, Va.) An analysis of the production of fish and shellfish in selected areas of Virginia, Maryland, and North Carolina during 1955 is presented in the first part of this report. The author discusses landings in the areas covered, production of the principal species: scup or porgy, croaker, sea bass, sea trout, fluke, spot, shad, crab meat, and shrimp. Information on the menhaden fishery is also presented--includes receipts reported by Virginia and North Carolina fish meal and oil plants by months for 1955 and 1954. Statistical tables make up the second part of the report, showing production of fish and shellfish for each area by months, production by localities for 1955 and 1954, and shrimp landings in selected North Carolina ports by months. The areas covered in this report include: Atlantic, Beaufort, and Morehead City, N. C.; Norfolk, Portsmouth, Messick, Seaford, Yorktown, Gloucester Point, Newport News, Hampton, Lancaster County, Cape Charles, Oyster, Willis Wharf, and Wachapreague, Va.; Ocean City, Cambridge, and Crisfield, Md. In addition, shrimp landings are reported for Atlantic, Beaufort, Morehead City, Pamlico County, Englehard, and Southport, N. C.

Receipts of Fresh and Frozen Fishery Products at New York City's Fulton Fish Market, 1955, by T. J. Risoli, 18 pp., processed. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Contains an analysis of fishery products receipts for 1955 and marketing trends at New York City. The author discusses in the first part of this report the salt-water market receipts; marketing trends; trends in method of transportation; receipts by shipping areas; selling prices of selected species; containers; methods for expanding markets; imports of fishery products through the New York customs district; fresh-water fish receipts; and nutritive value of fishery products. The tables, in the second part of this report, present data on receipts of fish and shellfish in the salt-water section of Fulton Market by months and method of transportation, by species and method of transportation, and by states and provinces of origin.

Boston Fishery Products Monthly Summary, July 1956, 15 pp.; Boston Fishery Products Monthly Summary, August 1956, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Landings and ex-vessel prices by species for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; and Boston frozen fishery products prices to primary wholesalers; for the months indicated.

California Fishery Products Monthly Summary, August 1956, 10 pp.; California Fishery Products Monthly Summary, September 1956, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of raw tuna and tunalike fish, herring, mackerel, anchovies and squid; pack of canned tuna, mackerel, herring, anchovies, and squid; market fish receipts at San Pedro, Santa Monica, San Diego, and Eureka areas; California imports; canned fish and frozen shrimp prices.

(Chicago) July 1956 Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Prices, 10 pp.; (Chicago) August 1956 Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Prices, 10 pp. (Market News Service, U.S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces; fresh-water fish, shrimp, and frozen fillet wholesale market prices; for the months indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, August 1956, 5 pp.; Gulf Monthly Landings, Production, and Shipments of Fishery Products, September 1956, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; and wholesale prices of fish and shellfish on the New Orleans French Market; for the months indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, August 1956, 4 pp.; Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, September 1956, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va.). Fishery production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the months indicated.

(New York) Monthly Summary - July 1956 - Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, 4 pp.; (New York) Monthly Summary - August 1956 - Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.). Receipts in the salt-water section of the Fulton Fish Market by species and by states and provinces for the months indicated.

(Seattle) Monthly Summary - Fishery Products, July 1956, 5 pp.; (Seattle) Monthly Summary - Fishery Products, August 1956, 6 pp.; (Seattle) Monthly Summary - Fishery Products, September 1956, 6 pp., (Market News Service, U. S. Fish & Wildlife Service, 421 Bell St. Terminal, Seattle 1, Wash.). Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Oregon) wholesale dealers; also Northwest Pacific halibut landings.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Alaska Fishery and Fur-Seal Industries, 1954, by Seton H. Thompson, Statistical Digest No. 37, 73 pp., illus., printed, 35 cents, 1956. Detailed reports and statistical tables concerning the operation and yield of the various fishery industries are presented, with added data on certain related matters, particularly the condition of the fishery resources. Under the section on fishery industries, the following subjects are covered: court decisions; Alaska Department of Fisheries; research; exploratory fishing investigations; administration; management; and general statistics on salmon, herring, halibut, shellfish, and miscellaneous fishery products. The second section on the Pribilof Islands fur-seal industry covers administration, fur-seal population studies, and general statistics on the fur seals taken in 1954. A statement is also included on sealing privileges accorded aborigines.

Biology of the Sea Lamprey in Its Parasitic Phase, by Phillip S. Parker and Robert E. Lennon, Research Report 44, 35 pp., illus., printed, 20 cents, 1956.

Biology of Young Lake Trout (SALVELINUS NAMAYCUSH) in Lake Michigan, by John Van Oosten and Paul H. Eschmeyer, Research Report 42, 91 pp., illus., printed, 40 cents, 1956.

Effect of Pulse Frequency and Duration in Guiding Salmon Fingerlings by Electricity, by Howard L. Raymond, Research Report 43, 22 pp., illus., printed, 15 cents, 1956.

How to Cook Halibut, by Kathryn L. Osterhaug and Rose G. Kerr, Test Kitchen Series No. 9, 12 pp., illus., printed, 20 cents, 1956. A new fishery publication of interest to housewives, home economists, and food editors. Contains 25 choice recipes which have been developed and kitchen-tested by the Service's staff of home economists. The halibut, as the booklet explains, is the largest of the flatfishes and is found in the cold waters of the north Pacific, the Arctic, and the north Atlantic Oceans. Its delicious white, translucent meat is known and appreciated by fish gourmets the country over.

Frozen steaks or fillets may be cooked without thawing if additional cooking time is allowed. When steaks or fillets are to be breaded or stuffed, they are more easily handled if they have been previously thawed. The preferred method for thawing frozen fish is to leave the fish in the refrigerator overnight. If room-temperature thawing is necessary, great care must be taken so that the fish remains chilled at all times. Halibut may be prepared by any of the basic cooking methods such as frying, baking, broiling, boiling, and steaming. Some of the easy-to-make yet out-of-the-ordinary recipes included are: halibut avocado cocktail, halibut and onion soup, curried halibut casserole, broiled halibut steaks with anchovy butter, halibut Hawaiian, halibut steaks with piquant meringue, and halibut in herb sauce. In addition to the recipes for cooking halibut, the authors describe briefly the halibut fishery.

Preparation of a Dry Product from Condensed Menhaden Solubles, by C. F. Lee, Research Report 45, 35 pp., illus., printed, 20 cents, 1956. Deals with the methods of preparation and with factors determining the characteristics of a dried fish-solubles product. The first portion of the report deals with the preparation and study of the drying characteristics of different samples of menhaden solubles. A Suitability Factor, designed to rate on a comparative scale the drying behavior and properties of the various dried products, was developed but is not the sole criterion of the value of a specific sample. The second portion deals with the chemical analysis of the samples. The ammonia, dry solids, fat, ash, crude and corrected protein content as well as the pH, specific gravity, viscosity and thixotropy of the samples were determined. The effect of additives on the properties of the dried products was investigated. Results are summarized, and conclusions as to the present commercial feasibility of such a product are made.

Validity of Age Determination from Scales, and Growth of Marked Lake Michigan Lake Trout, by Louella E. Cable, Fishery Bulletin 107 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 57), 62 pp., illus., printed 45 cents, 1956.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATION THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

"Agriculture, Food Supplies, and Atomic Radiation." article, Science, vol. 124, no. 3211, July 13, 1956,

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pp. 63-66, printed, single copy 25 cents. Science, 1515 Massachusetts Ave., Washington 5, D.C. This article is the text of the summary report of the Committee on the Effects of Atomic Radiation on Agriculture and Food Supplies. The report is one part of a study of the biological effects of atomic radiations conducted by the National Academy of Sciences with the support of the Rockefeller Foundation. It discusses tracer studies in agriculture, crop production, animal production, radioisotopes in agricultural products and foods, environmental changes and ecological studies, and the use of radiation as a means of preserving certain foodstuffs.

Appraising the Market for the Services You Offer, by Edward L. Anthony, Small Marketers Aids no. 15, 4 pp., printed. Small Business Administration, Washington 25, D.C., August 1956.

"Are Fish Disturbed by the Echo-Sounder ?" by J. Scharfe, article, Fischereiwelt, vol. 2, no. 2, February 1951, pp. 30-31, printed in German. (Translated from German and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B.C., Canada.)

Amount of Herring Spawn Deposited in British Columbia Coastal Waters in 1956, by D. N. Outram, Circular no. 42, 13 pp., illus., processed. Pacific Biological Station, Fisheries Research Board of Canada, Nanaimo, B.C., Canada, August 1956. Pacific herring, Clupea pallasi, spawn in shallow water along the shoreline of British Columbia. The majority of eggs are deposited on vegetation, in or just below the intertidal zone, i.e., between the high and low tide levels. Spawning grounds may vary in size from a few yards to several miles, the length and width being largely determined by the distribution of the vegetation and the stage of the tide at time of spawning. The spawning grounds are not randomly distributed along the coastline but are found in certain preferred regions year after year. The measurement of the extent and intensity of herring spawnings along the British Columbia coast is carried out annually by the Canadian Department of Fisheries. This paper discusses the purpose of the spawn surveys, survey methods, and the results of the 1956 spawn survey.

Arsberetning fra Fiskeriministeriets Forsøgslaboratorium for 1955 (Annual Report to the Danish Fishing Industry), 55 pp., illus., printed in Danish with English translation of the main experimental results. Fiskeriministeriets Forsøgslaboratorium, København, Danmark, 1956. Describes the results of the following experiments: fat determination in herring and sand eels; determination of the nutritional value of fish for fur-animal feed; chilling of fish; combination of icing and chemical preservation of fish; washing and painting fish boxes to improve hygienic conditions; light-salted salmon substitute; freezing shrimp; freezing gar-pike; freezing breaded fish products; freezing in jelly; freezing fish fillets; installations for infra-red cooking of sardines; Norway lobster; fish balls; research on cans; fish meal; and fish silage.

"Average Lunar Month Catch of Sardine Fishermen in Southern California, 1932-33 through 1954-55," by Frances N. Clark, article, California Fish and Game, vol. 42, no. 4, October 1956, pp. 309-322, illus., printed. California Department of Fish and Game, Sacramento, Calif. The summary of this report states that "By developing new rules for determining which boats were fishing for sardines each season, the return to the southern California fishermen per lunar month has been carried through 1954/55. After almost complete collapse in 1952/53 and 1953/54, fishing in 1954/55 was more successful. In this season, however, the average monthly catch was still less than in any previous season except 1947/48 and the two mentioned above. Based on the total boat months calculated to be required to make each season's catch, the relative strength was measured for 22 year-classes occurring in the fishery between 1932/33 and 1954/55. In the 1930's only two year-classes were of less than average strength, while in the 1940's and 1950's nine were below average and only four were above. During 18 seasons the within-season average monthly catch in southern California showed an increasing decline year by year. In the 1930's fishing success held up through February, in the early 1940's only through January, in the late 1940's only through December, and in the early 1950's only through November."

Balik ve Balikcilik (Fish and Fishery), vol. IV, no. 9, September 1956, 190 pp., illus., printed in Turkish and English. Et ve Balik Kurumu, Istanbul, Turkey. A special issue of a monthly publication of the Meat and Fish Office which contains, among others, the following articles: "Fisheries Administration in Turkey;" "Development of Refrigeration in the Fishing Industry in Turkey;" "A Brief Review of the Turkish Canning Industry;" "Fisheries Research in Turkey;" "Recent Developments in Fishing;" and "Report on the Improvement of Gir-Gir Seines."

The Biological Effects of Atomic Radiation, Summary Reports, 120 pp., printed. National Academy of Science, Washington, D.C., 1956. Contains, among others, a summary report on effects of atomic radiation on oceanography and fisheries. An attempt has been made to summarize what is known about the actual and potential effects of radioactive materials in the oceanic realm and the interest of marine scientists in these substances. Answers are given to the following questions: (1) how does the atomic energy program affect the oceans; (2) is there naturally occurring radioactivity in the sea; (3) have weapons tests added measurable amounts of radioactivity to the sea; (4) in what other ways will radioactive materials be added to the oceans; (5) has the atomic energy program as yet resulted in serious damage to marine life; (6) do living things take up radioactive materials into their bodies; (7) are all the radioactive elements equally harmful; (8) how much radioactive waste will be produced by nuclear power reactors in the future;

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(9) what means are being considered for disposing of radioactive wastes; (10) will it be safe to introduce very large quantities of radioactive wastes from atomic power indiscriminately into the sea; (11) does this mean that large quantities of radioactive wastes should never be dumped in the sea; and (12) from what is known, where would be the safest place to dump radioactive wastes in the sea?

Boletim da Pesca (Fishery Bulletin), vol. X, no. 52, September 1956, 134 pp., illus., printed in Portuguese. Gabinete de Estudos das Pescas, 211 Avenida da Liberdade, Lisbon, Portugal. Contains, among others, the following articles: "O Aproveitamento das Lagostas do Noroeste Africano (Utilization of Lobsters of North Africa)," by Dr. C. Fernando Costa; and "Alguns Aspectos Significativos da Industria da Pesca em Portugal" (Some Significant Aspects of the Fisheries of Portugal), by Dr. Richard J. Houk.

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 6, no. 3, pp. 191-233, illus., printed in Japanese with summaries in English. Faculty of Fisheries, Hokkaido University, Hokodate, Japan, November 1955. Contains among others the following scientific papers: "Mechanical Studies of Fishing Net Materials. IV. A Method of Measuring the Diameter of a Netting Cord," by Tetsuo Miura; and "Studies on the Organic Phosphates in Muscle of the Aquatic Animals. I. On the Determination of Adenosine-polyphosphates in Muscle of Carp," by Tsuneyuki Saito and Ken-ichi Arai.

Bulletin of the International Oceanographic Foundation, vol. 2, no. 2, July 1956, pp. 66-127, illus., printed. The Marine Laboratory, University of Miami, Coral Gables, Fla. Includes, among others, the following articles: "More to Fishing than Fish," by F. G. Walton Smith; "Saltwater Gamefish;" "Floating Fish Factories," by Robert W. Ellis; "Rivers in the Sea;" "Treaders of the Sea," by J. L. McHugh and Hilary B. Moore; "The Amazing Angel Shark," by Bernard L. Gordon; and "Ups and Downs at Sea," by Hilary B. Moore.

(California) Abstract of Commercial Fisheries Laws of California, 1955-1957, folder, illus., printed. Department of Fish and Game, 926 Jay St., Sacramento 14, Calif., 1955.

(Canada) Journal of the Fisheries Research Board of Canada, vol. 13, no. 4, July 1956, pp. 449-598, illus., printed. Fisheries Research Board of Canada, Ottawa, Canada. Contains, among others, the following articles: "Populations of Herring (Clupea harengus L.) in Newfoundland Waters," by S. N. Tibbo; "Diet-Induced Differences in the Weight-Length Relationship of Aquarium Fed Sardines (Sardinops caerulea)," by David A. Farris; "The Effect of Fry Plantings on Whitefish Production in Eastern Lake Ontario," by E. D. Lapworth; "Chemical Changes in Nitrite-Treated Atlantic Cod Fillets in Relation to Spoilage Assessment," by E. B. Vaisey; and "Storage of Frozen Rosefish Fillets," by W. J. Dyer, Margaret L. Morton, Doris I. Fraser, and E. G. Bligh.

(Ceylon) Administration Report of the Acting Director of Fisheries for 1955 (Part IV--Education, Science, and Art), by H. C. Goonewardena, 29 pp., printed. Government Publications Bureau, Colombo, Ceylon, July 1956. Progress reports for the year 1955 are presented by the Department of Fisheries' Administration and Socio Economic Division, Development Division, Commercial Section, and Research Division. Among the subjects covered are: enforcement of fisheries regulations; cooperative development of the fisheries; mechanization of fishing craft; fresh-water fishery development; and fishery byproducts. Statistical data are also included on the production of fresh and cured fish, and imports and exports of fishery products and byproducts.

(Coast and Geodetic Survey) Tide Tables, Current Tables, and Tidal Current Charts, 1956 and 1957, 50 cents each. U.S. Coast and Geodetic Survey, Washington 25, D.C. The tide tables cover the East Coast, North and South America; and West Coast, North and South America. The current tables cover the Atlantic Coast and the Pacific Coast. The tidal current charts include the Boston Harbor, Long Island Sound and Block Island Sound, Narragansett Bay to Nantucket Sound, New York Harbor, Delaware Bay and River, Tampa Bay, San Francisco Bay, Puget Sound--northern part, and Puget Sound--southern part.

The Conservation Directory (A Listing of Organizations and Officials Concerned with the Protection of Wildlife and Other Natural Resources), compiled by Stewart M. Brandborg, 103 pp., printed, 40 cents. National Wildlife Federation, 232 Carroll St., NW., Washington 12, D.C., July 1, 1956. This, the forty-eighth Conservation Directory, is larger and more complete than any earlier edition. As in previous years, the public agencies of national, state, and territorial governments of the United States concerned with the protection of wildlife and other resources (including fisheries) are listed, as well as those of neighboring nations in North and South America. Most of the nongovernment organizations within the United States which have a national or statewide scope of interest are also included.

The Deep-Sea Fisherman, by Captain I. E. Allison, 90 pp., illus., printed. The Educational Supply Association, Limited, Esavian House, 181 High Holborn, London, W. C. 1, England, 1956. Although this booklet has been designed primarily for children between the ages of 8 and 12, adults will be interested in reading the straightforward description of the various methods of fishing used today, the parts of a modern trawler and its equipment, the duties of the various crew members, fish and their habits, a typical fishing voyage, the marketing of the catch, and the use of fishery byproducts. The author is the principal of The Nautical College, Hull, England. Considerable detail is covered in this small booklet, including what goes on aboard a fishing trawler and how the crew spend their time at sea. The booklet is well illustrated with photographs and line drawings. Divided into seven chapters, the

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booklet is very interesting and will be of value to the novice as well as to the one more familiar with fishing and fisheries.

"Developments in Mid-Water Trawling (Electronic Aids to Depth Regulation)," article, World Fishing, vol. 5, no. 9, September 1956, pp. 50-52, illus., printed. John Trundell Ltd., Temple Chambers, Temple Ave., London, E.C. 4, England. This is an abstract of a paper by W. Lochridge, given at a meeting of the Institution of Engineers and Shipbuilders in Scotland. The paper was under the title "Mechanization in Fishing Vessels," and deals largely with development in fish factoryships. This article discusses the development of otter trawls suitable for the small North Sea trawler and the larger ships of the Hull distant-water fleet. Trawling tests are described as well as a new stern design.

Die Seefischerei Nordwest-Europas (Struktur und Probleme), The Sea Fisheries of North-West Europe (Structure and Problems), by Dr. Wilhelm Blanke, 626 pp., illus., printed in German with the tables in both German and English, DM78 (about US$19.00), 1956. Krogers Buchdruckerei Abt. Fachbuchverlag, Bahnhofstrasse 17, Hamburg-Blankenese, West Germany, 1956. An exhaustive and very comprehensive treatise on the sea fisheries of North-West Europe. This book brings economic research work on fisheries to a new point, particularly with regard to inter-regional comparisons and to fisheries politics. For practical purposes it is an excellent work of reference. According to the publishers, the study was sponsored by many German and foreign organizations, administrative boards and authorities, including the Association of the German Deep Sea Fisheries and the Bremerhaven Chamber of Commerce and Industry. The work was completed by the Research Division for Fisheries Economics of the Bremen Committee for Economic Research. The detailed data contained in this book are well organized and presented. Chapter 1 deals first with the sea fisheries in the world and in North-West Europe and includes information on total catch and utilization, fishing fleets and fishermen, and exports of fish and fishery products. For North-West Europe, data on national income and landings by domestic fishing craft are also covered. The development and structure of the sea fisheries in each of the North-West European countries makes up the second part of chapter 1. The countries included are Norway, Sweden, Denmark, Faroes, West Germany, Netherlands, Belgium, France, England and Wales, Scotland, North-Ireland, Eire, and Iceland. Problems of the North-West European sea fisheries are discussed in the second chapter, with the first part concentrating on inter-regional problems and the second part with regional problems for each of the countries mentioned above. Half of the book consists of an appendix the major part of which is statistical tables giving data on landings of sea fish by species, by country, by type of fleet, as well as data on number of fishermen, number of vessels, external trade, national fisheries income, and details on other phases of the fisheries. The textual part of the tables is presented in both German and English which makes them very useful for those who cannot read German. Most of the statistics are for the years 1950-1954. Also included in the appendix is a list giving the scientific, German, Norwegian, English, and French names of principal sea fish and shellfish; and principal technical terms in German, English and French. In my opinion, this book should be of considerable value to businessmen, researchers, students, and others interested in the European fisheries, in particular, or fisheries in general.

--J. Pileggi

Economic Marine Algae of Tropical South and East Asia and Their Utilization, by J. S. Zanefeld, Special Publications No. 3. Indo-Pacific Fisheries Council, Maliwan Mansion, Phra Atit Road, Bangkok, Thailand, 1955.

Exploring the Deep Pacific, by Helen Raitt, introduction by Roger Revelle, 272 pp., illus., printed, $3.75. W. W. Norton & Co., 55 Fifth Ave., New York 3, N.Y. Unofficial account of an oceanographic expedition in the South Pacific.

Fisheries Statistics of the Philippines, 1955, by Jose R. Montilla and Justo R. Montemayor, 64 pp., processed. Department of Agriculture and Natural Resources, Bureau of Fisheries, Manila, Philippines. This report is devoted to fishery production in the Philippines. The tables are grouped together under the headings (1) production, consumption, and requirements; (2) commercial fishing vessels; (3) fish ponds; (4) foreign trade; and (5) other data. The tables are subdivided according to gear used, kind of fish caught, monthly production, and fishing grounds. There are also statistics on fish pond production, and imports and exports of fishery products (including canned and processed fish). Statistics also cover reptile skins, seaweeds, sharkfins, shells, sponges, trepang, turtle eggs, and turtle shells. The appendices contain information on the fishery districts, the forms used in collecting fishery statistics, and an inventory of fishing gear used in the Philippines for the year 1953. Except for Table 1 which presents fish production data since 1946, most of the information covers the five-year period 1951-55.

"Fishermen's Organizations and the Regulation of Fish Prices in Sweden," by Christian Hessle and Sigmund Verstandig, article, FAO Fisheries Bulletin, vol. IX, no. 3, July-September 1956, pp. 130-143, printed. Food and Agriculture Organization of the United Nations, Rome, Italy. This article is a summary of Parts 2-5 of the monograph of the same title. Part I, a general survey of Swedish fisheries, the fishing population, trade and government administration, has been excluded from this summary. Part 2 discusses the early development of the fishermen's organizations in Sweden; Part 3, the fishermen's professional organizations; Part 4, the fishermen's trading organizations; and Part 5, price regulations.

"Fishing with Electricity," by B. Hnatevic, Bulletin of the Czechoslovak Academy of Agricultural Sciences, No. 1-2, 1953, pp. 101-109, printed in Czechoslovak. (Translated from Czechoslovak

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and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B.C., Canada.)

Fiskeri-Beretning for Arêt 1955, 198 pp., illus., printed in Danish with resume in English. I Kommission Hos G. E. C. Gad, Kobenhavn, Denmark. This report contains detailed statistics on the Danish fisheries for the calendar year 1955. Included in the report are data on number of fishermen, number of fishing craft, value of fishing vessels, catch by species, landed value of the catch, resumes by fisheries, and imports and exports of fishery products.

(FAO) General Fisheries Council for the Mediterranean, Proceedings and Technical Papers no. 3, 527 pp., illus., printed in French and English, $5. Food and Agriculture Organization of the United Nations, Rome, Italy, 1955. (Available from Columbia University Press, International Documents Service, New York 27, N.Y.) This document is divided into two parts. The first part includes the proceedings of the third meeting of the General Fisheries Council for the Mediterranean held in Monaco (Principality), October 14-19, 1954. The second part comprises the technical papers presented during this meeting. Among the subjects covered are various aspects of sardine biology; freezing of sardines; fisheries of certain French ports; transportation and preservation of fish in Spain; organization of fish trade in Italy; carp culture in rice fields; water pollution; fisheries administration in Yugoslavia; "The Mediterranean Spiny Lobsters" (description of Palinurus vulgaris, P. mauritanicus and P. rissoni); vocational training of fishermen; fish meal; economic fishery statistics in Yugoslavia; sea fry for stocking inland waters; safety measures for divers; fish curing in Yugoslavia; cold storage and canning of mackerel; "Improvement of Large Marine Crustacean Fishing Technique in Yugoslavia" (describes use of collapsible pots for fishing lobsters and spiny lobsters); Salmonidae breeding in Mediterranean countries; short-finned tuna (Sarda sarda in Turkish waters); Black Sea coast fisheries; Norway lobster in Adriatic; natural bait for marine fishing; Mediterranean tunas (little tuna, Euthynnus alliteratus Raf.; and striped-bellied bonito, Katsuwonus pelamis L.); French River fisheries.

(FAO) The State of Food and Agriculture, 1956, 151 pp., illus., printed, $1.50. Food and Agriculture Organization of the United Nations, Rome, Italy, 1956. (Also available from Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N.Y.) The foreword points out that, "The world food and agricultural situation has recently tended to change less rapidly than during the years of postwar recovery. It has therefore seemed fitting to modify the form of the annual report on the state of food and agriculture, giving less emphasis to the current situation and short-term outlook and more to longer-term problems and to other special subjects which in the past it has not been possible to treat in detail. Last year's report consisted of a review of the developments of the whole postwar decade. This year the food and agricultural situation in 1955/56 and the outlook for 1956/57 are reviewed in a single chapter. The two following chapters, the first of the new series of special studies, deal respectively with some factors influencing the development of international trade in agricultural products, and with general trends and outlook in the world's fisheries. The report is introduced by the customary summary." The chapter on "World Fisheries: General Trends and Outlook with Examples from Selected Countries" discusses the characteristics of world production and trade; government policies in relation to the fishery industries; and typical cases of fishery development under different economic influences in Japan, Norway, Iceland, United Kingdom, Germany, United States, Canada, and the Union of South Africa and South-West Africa. Also presents current fishery development programs and outlook.

Food Expenditures of Households in the United States, Preliminary Report, 16 pp., processed. U.S. Department of Agriculture, Washington 25, D.C., August 1956. This report presents some preliminary results on food expenditures from a nationwide survey of household food consumption made in April-June 1955. Although food products are not broken down by specific categories, the general information may be of value to fisheries processors.

The Food and Feeding Habits of the Lemon Sole, by Bennet B. Rae, Scottish Home Department Marine Research No. 3, 35 pp., illus., printed, 6s. 8d. (92 U.S. cents). Her Majesty's Stationery Office, 13A Castle St., Edinburgh 2, Scotland, 1956.

"Growing Culture Pearls in Australia," article, Fisheries Newsletter, vol. 15, no. 7, July 1956, pp. 5, 7, illus., printed. Commonwealth Director of Fisheries, Department of Primary Industry, Canberra, Australia. Culture pearls will soon be produced for the first time in Australia, according to this article. If pilot scale operations are successful, it should mean the establishment of a new industry where development is badly needed, in northwest Australia--an industry which could become a substantial dollar earner along with spiny lobster tails, shrimp, and pearl shell.

How to Use Sodium Bisulfite to Control "Black Spot" on Shrimp, Special Service Bulletin No. 12, 4 pp., illus., printed. The Marine Laboratory, University of Miami, Coral Gables, Fla., August 1956. Research has shown that shrimp dipped in a dilute solution of the harmless chemical, sodium bisulfite, develop much less black spot than untreated shrimp. This report quotes the Food and Drug Administration's approval of this technique, and describes in detail the method of using sodium bisulfite on shrimp.

The Importance of Chilling Fish, by C. L. Cutting and J. Liston, D.S.I.R. Food Investigation Misc. Paper No. 7A/56, 2 pp., illus., printed. (Reprinted from Fish Trades Gazette, April 14, 1956.) White Fish Authority, Torry Research

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Station, Aberdeen, Scotland. Describes briefly the importance of chilling fish and the effect of temperature on bacterial growth. The authors state that, "For practical purposes the quickest, safest and easiest way to cool fish to about 32° F. and keep them at this temperature is to surround them and mix with them liberal amounts of crushed ice. Simply putting fish without ice into a chill room at 32° F. will cool them down very much more slowly even if the fish are laid out singly. Fish contained in wooden boxes put into a chill room without ice will cool down even more slowly since wood is a good heat insulator. Direct and intimate icing, therefore, because of its superior cooling action, ensures that spoilage of the fish during the cooling down period is reduced to a minimum."

Index Oyster Ground Franchises and Leases (Licenses, Vessels, and Individuals), July 1953-July 1955, 18 pp., printed. Shell Fish Commission, 185 Church St., New Haven, Conn. Contains excerpts from the shellfish laws; leasing of shellfish grounds; alphabetical lists of individuals and vessels licensed to work on the natural beds; list of owners and acreages by lot number as of July 1, 1955; leased grounds as of July 15, 1955; and general oyster statistics.

(India) Progress of Fisheries Development in India, 96 pp., figs., illus., printed. Central Inland Fisheries Research Station, Orissa, India, 1956. Contains the following papers: "Fisheries and Fishing Industry in India," by B. N. Chopra; "The Second Five-Year Plan of Fisheries Development," by D. Bhatia; "Marine Fisheries Research in India," by N. K. Panikkar; "Inland Fisheries Research and Extension in India," by B. S. Bhimachar; "Deep Sea Fishing in Indian Waters," by K. Chidambaram; "Mechanisation of Indian Fishing Craft," by P. B. Ziener; "Reclamation of Swamps for Fishery Development in Orissa," by G. N. Mitra; "Fish Culture Techniques in India," by K. H. Alikunhi; "Fish Preservation and Processing," by R. Venkataraman; "Fish Oil Industry in India," by Sundar Kini; "Fisheries By-Product Industry in India," by G. B. Mohanty; and "Socio-Economic Development of Fishermen Communities in India," by T. V. R. Pillay.

"Injuries Done to Trouts by Electric Fishing," by Fr. Volf, article, Bulletin of the Czechoslovak Academy of Agricultural Sciences, No. 1-2, 1953, pp. 104-109, printed in Czechoslovak. (Translated from Czechoslovak and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B.C., Canada.)

(Institute of Freshwater Research) Annual Report for the Year 1954 (and short papers), Report No. 36. Institute of Freshwater Research, Drottningholm, Sweden, 1956.

(Institute of Seaweed Research) Annual Report for 1955 and Review of Institute's Activities, 1945-1955, 52 pp., illus., printed. Institute of Seaweed Research, Inveresk, Midlothian, Scotland. This report reviews not only the work of the Institute of Seaweed Research during 1955 but also the achievements of the last ten years; that is, since the work began. It indicates the successes achieved in elucidating many of the scientific problems associated with the biochemistry, plant physiology, and ecology of the marine algae and the fundamental chemistry of their constituents; the development of techniques for the manufacture of algal chemicals and seaweed harvesting, and the assessment of their value in agriculture and medicine. This work has aided the development in this country of a new industry based on seaweed and has stimulated great interest in practically every maritime country in the world. As indicated in the report, the Institute, having fulfilled its original mandate, has reduced the scope of its activities. Its main concern will now be the support of fundamental seaweed studies at the universities, the maintenance of an information service, the supply of algal chemicals at cost and the provision of technical assistance and advice to those interested in seaweed utilization in the crofting communities in Scotland.

(International Law Commission) Addendum to Comments by Governments on Provisional Articles Concerning the Regime of the High Seas and the Draft Articles on the Regime of the Territorial Sea Adopted by the International Law Commission at its 7th Session, A/CN.4/99/Add.1, 103 pp., processed, April 5, 1956. United Nations, International Law Commission, New York, N.Y. The following addenda also have been issued: A/CN.4/99/Add.2, 11 pp., April 17, 1956; A/CN.4/99/Add.3, 2 pp., April 24, 1956; A/CN.4/99/Add.4, 2 pp., April 25, 1956; A/CN.4/99/Add.5, 9 pp., April 30, 1956; A/CN.4/99/Add.6, 2 pp., May 7, 1956; A/CN.4/99/Add.7, 4 pp., May 22, 1956; and A/CN.4/99/Add.8, 6 pp., June 25, 1956.

(International Law Commission) Co-operation with Inter-American Bodies. Report of the Secretary on the Proceedings of the 3rd Meeting of the Inter-American Council of Jurists Held at Mexico City, Jan.-Feb. 1956, A/CN.4/102, 45 pp., processed. United Nations, International Law Commission, New York, N.Y., April 12, 1956. The following correction and addendum also have been issued: A/CN.4/102/Corr.3, 1 p., May 18, 1956; and A/CN.4/102/Add.1, 1 p., May 7, 1956.

(International Fisheries Convention, 1946) Report of the AD HOC Committee Established at the Fourth Meeting of the Permanent Commission, September 1955, 45 pp., illus., processed. Office of the Commission, International Fisheries Convention, London, England, September 1956. At the meeting in London in 1955 the Permanent Commission decided to try to establish a satisfactory scientific basis for the conservation of the various fisheries within the Permanent Commission area by asking a working group of specialists some basic questions. This is a report on most of the questions put to the Committee. The subject matter is considered under six headings, as follows: (1) selectivity of meshes; (2) assessment of long-term effects of applying various cod-end mesh sizes; (3) assessment of immediate effects of applying various

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cod-end mesh sizes; (4) report on size limits in relation to the above results; (5) alterations or additions to Annex II or Article 6 of the Convention, proposed by member countries; and (6) recommendations for further research. The results presented in this report refer only to species and fisheries within the Convention area where the 80-mm. mesh size is in effect, and are based on the latest information available to the Committee at the time of their last meeting (May 1956).

(International Law Commission) Report of the International Law Commission Covering the Work of Its Eighth Session, 23 April - 4 July 1956, A/CN.4/104, 137 pp., processed. United Nations--General Assembly, International Law Commission, New York, N.Y., July 7, 1956. The International Law Commission held its eighth session at the European Office of the United Nations, Geneva, Switzerland from April 23 to July 4, 1956. The work of the Commission during the session is related in the present report. Chapter I covers the organization of the session. Chapter II contains the Commission's final report on the law of the sea; Chapter III consists of progress reports of work on the subjects of law of treaties, state responsibility, and consular intercourse and immunities; while Chapter IV deals with questions relating to the statute of the Commission and with administrative matters.

International Technical Conference on the Conservation of the Living Resources of the Sea, Rome, 1955, United Nations Document A/Conf.10/6, 20 pp., printed. United Nations, New York, N.Y., 1955.

The Investigations of Demersal Fish Resources in the East China and the Yellow Seas (3), 140 pp., illus., printed in Japanese with summaries in English. Seikai Regional Fisheries Research Laboratory, Maruo-Machi, Nagasaki City, Japan, March 1956. Contains the following articles: "A Statistical Account of the Japanese Trawl Fishery in the East China and the Yellow Seas after War II," by Shigeaki Shindo; and "Geographical Distributions of the Fishing Effort in the Fishing Grounds for Trawl Fishery in the East China and the Yellow Seas," by Osamu Kibesaki.

Iowa Fish and Fishing, by James R. Harlan and Everett B. Speaker, 377 pp., illus., printed, $2.50. State Conservation Commission, East 7th and Court, Des Moines 9, Iowa. This is the third edition of an interesting book on fish and fishing in Iowa. Text changes are made throughout and nomenclature brought up to date. It presents new chapters on natural baits and baiting, fishing tackle, and fish distribution; a major revision and extension of text on angling; and a new section on state-owned access to fishing waters.

Jaarcijfers Over de Visserij Gedurende Het Jaar 1955 (Annual Fisheries Statistics, 1955), Verslagen en Mededilingen van de Directie van de Netherlands with titles in English. Directie van de Visserijen, 's-Gravenhage, Netherlands, 1956. This report not only contains complete statistics on all fishing activities in the Netherlands but it also gives considerable descriptive information on the sea fisheries, inshore fisheries, river and inland fisheries, government regulations, whale fisheries, herring exports, fisheries research, and the fishing fleet.

(Jamaica) Report on Jamaica for the Year 1955, 386 pp., illus., printed, 7s.6d. (US$1.05). The Government Printer, Duke Street, Kingston, Jamaica, 1956. An annual report on developments in Jamaica during 1955. Contains, among many others, a chapter on the Jamaican fishing industry which states that "the natural evolution of the industry has been limited by the geography of the Island. The surrounding shallow-water shelf is not extensive--on the north coast it extends only a few hundred yards in some areas--and beyond this the seabed slopes sharply into water too deep to permit bottom fishing to be carried out efficiently without the use of power equipment. In consequence, the industry has not risen above a peasant-level operation, and even the extension of fishing onto the offshore Pedro Cays has done little to change this, the fishing being carried out by traditional canoes with large powered craft providing servicing facilities only." Descriptions of the fishing areas of Jamaica, methods of capture, development of the fresh-water fisheries and the marine fisheries are presented.

(Japan) Statistic Tables of Fishing Vessels (as of the End of 1955), General Report No. 8, 240 pp., printed in Japanese and English. Japanese Fisheries Agency, Tokyo, Japan. This annual report lists data on the various types of Japanese fishing craft as obtained by a fishing-vessel registration system. Statistics are given by types of gear, fishery, craft, and principal prefectures, together with comparisons for former years.

"The Larsen Mid-Water Trawl," by Alan Glanville, article, FAO Fisheries Bulletin, vol. IX, no. 3, July-September 1956, pp. 113-129, illus., printed. Food and Agriculture Organization of the United Nations, Rome, Italy. According to the author, the Larsen mid-water trawl has proved so effective that it is now in regular use in Scandinavia and other parts of Europe. Herring, sprat, anchovies, mackerel, and other pelagic fish are commonly caught with this gear which, owing to its low initial cost and simple operation by relatively small crews, may in some cases supplant the much more expensive ring nets and purse seines. This article discusses the method of operating the Larsen mid-water trawl, its advantages and disadvantages, conditions necessary for successful operation, and installation and operation of the gear.

"Measurement of Denaturation of Fish Protein," by J. I. M. Ironside and R. M. Love, article, Nature, vol. 178, no. 4530, August 25, 1956, pp. 418-419, printed. MacMillan & Co., Ltd., St. Martin's St., London, W.C.2, England.

(Malaya) Annual Report of the Fisheries Division, Department of Commerce and Industry, Singapore 1953, by Tham Ah Kow, pp. 205-250,

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illus., printed. Department of Commerce and Industry, Singapore, Malaya. Includes a general review of the fishing industry of Singapore, inventory of the fishing industry, availability of fresh fish, the fresh fish trade, prices of fresh fish, prices of producer goods, and trade in salt fish and certain marine products.

(Malaya) Annual Report of the Fisheries Division, Department of Commerce and Industry, Singapore 1954, 15 pp., printed. Department of Commerce and Industry, Singapore, Malaya. This report gives a general review of Singapore's fishing industry, availability of fresh fish, marketing, prices of fresh fish, and trade in salt fish and certain marine products.

Maryland Board of Natural Resources, Twelfth Annual Report, 1955, 215 pp., illus., printed. Board of Natural Resources, Annapolis, Md. A report for the fiscal year beginning July 1, 1954, and ending June 30, 1955, covering the activities, accomplishments, and recommendations of the several departments represented on the Board, including the Department of Tidewater Fisheries, the Department of Game and Inland Fish, and the Department of Research and Education. Under the Department of Tidewater Fisheries are discussed oysters, clams, blue crabs, fishing gear, fish abundance, striped bass investigations, and fishery statistics. Also contains an appendix which describes a survey of unlicensed commercial fish nets.

Nature's Guardians (Your Career in Conservation), by Harry Edward Neal, 192 pp., illus., printed, $3.50. Julian Messner, Inc., 8 West 40 Street New York 18, N. Y., 1956. This book will be a welcome and valuable addition to every high school and college library. As a vocational guidance aid that is written in popular style, it provides timely and practical information for persons interested in both the professional and nonprofessional employment opportunities in the important field of fisheries, forestry, soil and wildlife conservation. Probably no decision has a greater bearing on a person's outlook on life than the successful choice of a career. It is a decision that can lead to years of happiness and satisfaction or, which is too frequently the unfortunate case, frustration and disappointment. In his review of the opportunities that exist in the conservation field, the author presents the type of interesting information that will lead to further investigation by those interested in conservation careers, as well as provide enjoyable reading for those not so interested. To the further credit of the author, he not only covers the attractive phases of conservation management, but makes practical comment on many of the disadvantages of various federal and state employments. In his very realistic approach to the opportunities existing in the field, the author appropriately lists the opportunities and compensations that can be expected. While it was undoubtedly the decision of the author to confine his coverage to conservation activities, this reviewer has the feeling that the value of the book could have been considerably enhanced by including some coverage of employment opportunities in the allied fields of commercial exploitation of our natural resources. Such coverage might have stimulated additional interest on the part of many young persons who wish to look beyond early careers in Federal and state conservation activities to later service in private industry. As a supplement to the information on employment opportunities and references to governmental and nongovernmental conservation organizations and conservation magazines, the author provides a carefully selected bibliography of publications dealing with fishery, forestry, soil, and wildlife, conservation subjects. It is the opinion of this reviewer that Nature's Guardians will be similarly referred to as recommended reading in future books relating to conservation management.

--D. Y. Aska

(Norway) Lofotfiskets Lønnsomhet 1954 (Lofot Fishery Profitability 1954), by Kare Ruud, Fiskeridirektoratets Smaskrifter Nr. 5 (Fishery Directorate Pamphlet No. 5), 20 pp., printed in Norwegian. (Reprinted from Fiskets Gang, no. 38, 1954.) A/S John Griegs Boktrykkeri, Bergen, Norway, 1954.

Observations on the Spawning Runs of Brown Trout in the South Queich, Loch Leven, by W. R. Munro and K. H. Balmain, Scottish Home Department Freshwater and Salmon Fisheries Research no. 13, 16 pp., illus., printed, 4s. 6d. (65 U.S. cents). Her Majesty's Stationery Office, 13A Castle St., Edinburgh 2, Scotland, 1956.

Observations on the Taxonomy, Biology, and Ecology of the Engraulid and Clupeid Fishes in the Gulf of Nicoya, Costa Rica, by Clifford L. Peterson, Bulletin vol. 1, no. 5, pp. 139-280, illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1956.

"Oceanography, Fisheries, and Atomic Radiation," article, Science, vol. 124, no. 3210, July 6, 1956, pp. 13-16, printed, single copy 25 cents. Science, 1515 Massachusetts Ave. NW., Washington 5, D.C. This article is the text of the summary report of the Committee on the Effects of Atomic Radiation on Oceanography and Fisheries. The report is part of a continuing study on the biological effects of atomic radiation conducted by the National Academy of Sciences with the support of the Rockefeller Foundation. It discusses how the atomic energy program affects the oceans, radioactivity in the sea, damage to marine life, radioactive waste, and the use of radioactive materials to study the ocean and fisheries.

Old Fourlegs: The Story of the Coelacanth, by J. L. B. Smith, 270 pp., printed, 21s. (US$2.94). Longmans, Green & Co., 55 Fifth Avenue, New York 3, N. Y. The story of the author's hunt for this "prehistoric fish," the coelacanth.

Our Vanishing Shoreline, 36 pp., illus., printed. National Park Service, U.S. Department of the Interior, Washington 25, D. C. A report of a survey made in 1954 of the seashore recreation area along the Atlantic and Gulf coasts, from Calais, Maine to Brownsville, Texas. The survey was made to learn how much of this area

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has already been developed or spoiled, how much is left, and how much is suitable for public use.

"Oyster Farming," by H. Van Pel, article, SPC (South Pacific Commission) Quarterly Bulletin, vol. 6, no. 3, July 1956, pp. 19-20, illus., printed. South Pacific Commission, Noumea, New Caledonia. According to the author, "Edible oysters are not cultivated in the South Pacific Commission area, although they are gathered in many places from the rocks or the mangrove roots on which they grow naturally. In most cases these oysters are misshapen or even stunted, often because they were too crowded on their supports, in other cases because the food supply is not adequate, sometimes because they have grown at an unsuitable level. Whenever it finds itself in a naturally suitable environment, the oyster grows well." This article describes the simple technique used by oyster farmers in the Philippines, where conditions for oyster cultivation are similar to those found in many parts of the South Pacific.

Poisoning by Barracuda and Other Fishes, by Donald de Sylva, Special Service Bulletin #13, 10 pp., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla., August 1956.

Populations of the Black Mullet (MUGIL CEPHALUS L.) in Florida, by Donald P. de Sylva, Howard B. Stearns, and Durbin C. Tabb, Technical Series No. 19, 45 pp., illus., printed. Marine Laboratory, University of Miami, Coral Gables, Fla., June 1956.

"Presence of Fish and Echo-Indications," by A. Meyer, article, Die Fischwirtschaft, vol. 5, no. 2, February 1953, pp. 45-47, printed in German. (Translated from German and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)

"Procedimientos de Conservacion del Pescado por el Frio" (Methods of Conserving Fish by Freezing), by Pedro Perez Adsuar, article, Revista del Frio, vol. 1, no. 2, April-June 1956, pp. 111-120, printed in Spanish. Centro Experimental del Frio, Madrid, Spain.

Produccion Pesquera de la Republica Argentina Anos 1946-53 (Fish Production in the Argentine Republic, 1946-53). Ministerio de Agricultura y Ganaderia, Departmento de Investigaciones Pesqueras, Buenos Aires, Argentina, 1955.

Protokolle zur Fischereitechnik (Journal of Fishery Technology), Heft 17, Bd. 4 (Vol. 4, no. 17), pp. 32-83, illus., processed in German, Institut fur Netz- und Materialforschung, Hamburg 36, Neuer Wall 72, Germany, May 1956. Contains the following articles: "Fangmethoden und Fanggerate beim Rochenfang in Deutschland" (Methods of and Gear for the Catching of Rays in Germany), by J. Scharfe; "Deutsche und Franzosiche Bezeichnungen von Fanggeraten" (German Schleppnetzen" (How to Measure Net Meshes in Trawl Nets), by A. v. Brandt; and "Langenveranderungen von Netzgarnen durch Wasserung" (Changes in the Length of Net Mesh and Net Thread by the Influence of Water), by G. Klust.

Report to Congress on the Mutual Security Program (For the Six Months Ended June 30, 1956), 36 pp., illus., printed. Mutual Security Agency, Washington 25, D. C.

Rio Parana, sus Peces mas Comunes, Pesca Comercial (The Most Important Fishes and the Commercial Fishery of the Parana River), by Juan Manual Cordini, Publicacion Miscelanea No. 410, 86 pp., illus., printed in Spanish. Ministerio de Agricultura y Ganaderia, Buenos Aires, Argentina, 1955.

Salt-Water Aquarium Fish, by Herbert R. Axelrod and William Vorderwinkler, 160 pp., illus., printed, $3.95. Sterling Publishing Co., Inc., 122 East 25th St., New York 16, N. Y.

Sampling Methods Used in Japanese Fisheries Catch Statistics, Occasional Paper No. 55/2. Indo-Pacific Fisheries Council, Maliwan Mansion, Phra Atit Road, Bangkok, Thailand, 1955.

Sbornik Ceskoslovenske Akademie Zemedelskych Ved, Zivocisna Vyroba (Annals of the Czechoslovak Academy of Agricultural Sciences, Animal Production), Rocnik XXIX, Cislo 4 (vol. XXIX, no. 4), 1956, pp. 239-318, printed in Czechoslovak with summaries in Russian and English. The Czechoslovak Academy of Agricultural Sciences, Praha XII, Slezska, Czechoslovakia. Contains summaries in English of the following articles: "Purifying and Utilization of Waste Waters from Slaughterhouses and Factories of the Meat Industry in Fish Assimilation Ponds;" "Better Exploitation of the Natural Productivity of the Fish Ponds through Increase in Stocks of Fish;" "New Discoveries Concerning the Artificial Breeding of Pike;" "Investigation of the Reasons for Losses in Hatching of Trout Roe in Hatcheries;" and "Strange Life of the Eel (Anguilla anguilla L.)."

Seamanship, by T. F. Wickham, 192 pp., illus., printed, $3.75. Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y., 1956. The author, who is the Seamanship Instructor at The National Nautical School, Portishead, Somerset, England, presents the basic aspects of the art of good seamanship in a simple and straightforward manner. The novice as well as the experienced seaman will find valuable information in this small book. However, basically it is a factual manual for the novice. Among the subjects covered by the book are ship routine and ships, rope work, compass and steering, rule of the road at sea, tides and buoyage, flags and signals, anchors and cables, mooring and berthing, cargo work, speed and soundings, and lifeboats.

--J. Pileggi

"Shell Disease in Portuguese Oysters," by H. A. Cole and G. D. Waugh, article, Nature, vol. 178, no. 4530, August 25, 1956, p. 422, printed. MacMillan & Co., Ltd., St. Martin's St., London, W.C. 2, England.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATIONS ISSUING THEM.

Some Deaths Due to Fish Poisoning (Ichthyosarcotoxism) in India, by S. Jones, 8 pp., illus., printed. (Reprinted from Ind. Jour. Med. Res., vol. 44, no. 2, April 1956, pp. 353-360.) Central Marine Fisheries Research Sub-Station, Calicut, Malabar, India.

Some Notes on the Ovary of Albacore, GERMO GERMO, Taken from the Coral Sea, by Kazumi Isii and Motoo Inoue, 6 pp., printed in Japanese with summaries in English. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 22, no. 2, June 1956, pp. 89-93.) Japanese Society of Scientific Fisheries, Tokyo, Japan.

Statistical Abstract of the United States, 1956, issued by the U. S. Department of Commerce, printed, $3.75. For sale by Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Studies of the Sexual Development and Spawning of Yellowfin Tuna (NEOTHUNNUS MACROPTERUS) and Skipjack (KATSUWONUS PELAMIS) in Three Areas of the Eastern Pacific Ocean, by Examination of Gonads, by Milner B. Schaefer and Craig J. Orange, Bulletin vol. 1, no. 6, pp. 283-349, illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1956.

"Studies on Deep Mass Culture of Algae in Israel," by A. M. Mayer, A. Eisenberg, and M. Evenari, article, The Scientific Monthly, vol. 83, no. 4, October 1956, pp. 198-203, illus., printed. The Scientific Monthly, 1515 Massachusetts Ave., NW., Washington 5, D. C. A deep unit for the mass culture of algae is described. A cheap method of agitation has been developed. Yields as high as 21 grams (dry weight) per square meter of illuminated area per day have been obtained. A yearly average for three algae species gave 16 grams per square meter of illuminated area per day. Yields calculated theoretically from the actual yield are as high as 32 grams. The suitability of Israel for mass culture is pointed out. It is considered that the present results bring the mass culture of algae toward the borderline of economic feasibility. Its practical feasibility may be taken as established.

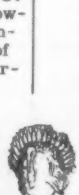
Trade News, vol. 9, no. 1, July 1956, 21 pp., illus., printed. Department of Fisheries of Canada, Ottawa, Canada. Contains among others the following articles: "Artificial Stream Produces Salmon;" "Some Factors Affecting the Shelf Life of Frozen Fish," by O. C. Young; and "The Fisheries of Turkey," by I. S. McArthur.

(Union of South Africa) Department of Nature Conservation, P. O. Box 152, Stellenbosch, Union of South Africa, 1955. Contains, among others, a section by the Division of Inland Fisheries which includes articles on the fresh-water fisheries of the Cape Province, Johkershoek Hatchery--Stellenbosch, Pirie Trout Hatchery--King William's Town, and stocking of public waters. A section on research and field surveys discusses the establishment of an eel fishery in the Cape Province and the production of fish for food under the Transkei fish farming project. A report of the Provincial Inland Fisheries Officer at Cape Town is also presented.

United States Standards for Grades of Frozen Fish Sticks (Effective August 21, 1956), 6 pp., processed. Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D.C., July 18, 1956. Includes product description and grades of frozen fried fish sticks, recommended weights and dimensions, factors of quality, definitions and methods of analysis, tolerances for certification of officially drawn samples, and score sheet for frozen fried fish sticks. The standards are designed to serve as a convenient basis for sales, for establishing quality control programs, and for determining loan values. They will also serve as a basis for the inspection of this commodity by the Federal inspection service.

Vitamin A_2 in Indian Fresh-Water Fish-Liver Oils, by S. Balasundaram, H. R. Cama, P. R. Sundaresan, and T. N. R. Varma, article, The Biochemical Journal, vol. 64, no. 1, September 1956, pp. 150-154, printed. Cambridge University Press, American Branch, 32 East 57th St., New York 22, N. Y.

(White Fish Authority) Report of the Advisory Panel on the Improvement of Retail Fish Sales, 43 pp., illus., printed, 1s. (14 U.S. cents). White Fish Authority, Tilbury House, Petty France, London, S.W. 1, England. The Panel's first report and accompanying appendices deal with the best methods of improving the appearance and selling efficiency of fishmongers' and fish friers' shops. The recommendations of this report are given in two sections. The first deals with general aspects of shop improvement, applicable to all types of fishmongers' shops. The second provides actual examples of progressive shop designs in the form of plans, drawings, and photographs. These designs illustrate the application of general principles to specific types of shop, for which three broad classifications are given.



CONTENTS (CONTINUED)

Page

TRENDS AND DEVELOPMENTS (Contd.):
North Atlantic Herring Research (Contd.):
Midwater Trawl Gear Tested by M/V Metacomet in Gulf of Maine (Cruise 7) 43
Lampara Seine, Midwater Trawl, and Depth Indicator Tested by M/V Metacomet (Cruise 8) 44
North Pacific Exploratory Fishery Program:
Bottom Fish Survey in Waters off Southeastern Alaska by M/V John N. Cobb (Cruise 29) 45
Oregon:
Experimental Fishing for Dover Sole 45
Fingerling Fish Passage at Dams to be Investigated 46
Northwest Albacore Tuna Catches Sampled 46
Pacific Oceanic Fishery Investigations:
Exploratory Tuna Fishing Around Marquesas Islands by M/V Charles H. Gilbert (Cruise 30) 47
Good Albacore Fishing Found North of Hawaii by M/V John R. Manning (Cruise 32) 48
Transportation Rates 49
Reclamation to Build Fish Screen to Save Young Fish on Delta-Mendota Canal, California 49
Saltonstall-Kennedy Act Fisheries Projects:
Fish and Wildlife Service Reports Progress Made 51
American Fisheries Advisory Committee Recommends Stepped-Up Research Program ... 53
Shellfish Sanitation Workshop 54
South Carolina:
Fisheries Biological Research Progress, June-September 1956 55
Sport Fishing and Hunting Survey Reveals $3 Billion Annual Expenditures 56
United States Fishing Fleet Additions 58
U. S. Fish Stick Production 58
U. S. Foreign Trade:
Edible Fishery Products, July 1956 59
Imports of Canned Tuna in Brine Under Quota Proviso 59
Imports and Exports of Selected Fishery Products January-July 1956 60
Groundfish Fillet Imports Decline in September 1956 60
White House Pays Tribute to Fishing Industry 61
Wholesale Prices, September 1956 61
FOREIGN: 64
International:
Baltic Salmon Fisheries Convention Proposed ... 64
Agreements:
Iceland and Czechoslovakia Amend 1954 Trade Agreement 64
Italy and Yugoslavia Sign Agreement on Fishing in the Adriatic 65
General Agreement on Tariffs and Trade:
11th Session in Geneva 65
Food and Agriculture Organization:
Modern Diving Aids May Increase Shell Production 66
New Director General Elected 67
Great Lakes Fisheries Commission:
First Annual Meeting 68
Northwest Atlantic Fisheries Commission:
Northwest Atlantic Fisheries Trends for the First Part of 1956 68
Argentine Republic:
East German Trade Agreement With Argentine Fish Industries and Cooperatives 69

Page

FOREIGN (Contd.):
Australia:
Development of Fishing Industry in Papua and New Guinea Planned 69
Japanese Pearl-Shell Fleet Operates Off Northern Australia 70
New Cargo Ships to Increase Reefer Space 70
Progress in Queensland Shrimp Fishery 71
Whaling Season in 1956 Expected to Exceed 1955 in Value 73
Canada:
Antibiotics Approved for Fish Preservation 73
Fishermen's Indemnity Plan 74
Fish Stick Plants Ordered by Russians 75
Review of 1956 Herring Fishery in British Columbia 75
Territorial Sea Limit of 12 Miles Advocated 76
Chile:
Territorial Waters Claims Position Maintained .. 77
Ecuador:
Conversion Requirement Increased on Shrimp Export Earnings 77
Formosa:
Shrimp Fisheries 78
German Federal Republic:
Synthetic Net Fiber 78
Telecommunicating Depth Finder for Midwater Trawl Nets 79
Tryptophane Content of Fish-Meal Protein Better Indicator of Nutritive Value 80
Haiti:
Canned Sardine Market 81
Hong Kong:
New Net Factories 82
Iceland:
Exports of Frozen Fish to U. S. Increase 82
Herring Catch on South Coast Higher in 1956 82
New Trade Agreement With Russia Includes Fishery Products 82
India:
Conference Discusses Development of Fisheries .. 83
Second Five-Year Plan Includes Commercial Fisheries Development 83
Israel:
Shrimp Fishery 85
Italy:
Financial Assistance to Fishing Industries Proposed 86
Market for Marine-Animal Oils 86
Participates in General Fisheries Council for the Mediterranean 86
Japan:
Antarctic Whaling Fleets for 1956/57 Season Increased 87
Brazil Invites Research Ship to Survey Fishery Resources 87
Canned Sardine Pack for 1955 87
Crab Canning Industry of Hokkaido Island 88
The Crisis in the Tuna Industry 90
Cultured Pearl Industry Affected by Hot Spell ... 93
Fish Net Knitting Machines and Operators to Go to Canada 93
Fishery Products Exports Rank Fourth in Value .. 93
Overseas Fishing Ventures Planned 93
North Pacific Factoryship King Crab Meat Pack Through July 1956 94

Contents Continued on Back Cover

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FACTORS TO BE CONSIDERED IN THE FREEZING AND COLD STORAGE OF FISHERY PRODUCTS

Fishery Leaflet 429 (Refrigeration of Fish - Part 3, "Factors to be Considered in the Freezing and Cold Storage of Fishery Products") is one of a series of leaflets on the refrigeration of fish. This leaflet is concerned with the changes which take place during the freezing and cold storage of fish and with the packaging materials presently in use for fishery products. The effects of temperature changes, freezing rates, freezing methods, ice-crystal size, and other factors on the fish meat during freezing are discussed. Changes in texture, color, and flavor of the meat of frozen and stored fishery products as related to the effects of rancidity, desiccation, storage temperature, available oxygen from the air, and presence of other pro-oxidents, etc., are treated in detail. Information on the frozen life of fishery products is included. The commonly-used protective glazes, films, overwraps, and cartons are discussed and the relative merits of the various types of protective packaging are pointed out.

In addition to Part 3 of this series, Part 4, "Preparation, Freezing and Cold Storage of Fish, Shellfish, and Precooked Fishery Products"--Fishery Leaflet 430--has been released and free copies of both FL. 429 and FL. 430 can be obtained from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

To be released in the near future are Part 1, "Cold Storage Design and Refrigeration Equipment," Fishery Leaflet 427; Part 2, "Handling Fresh Fish," Fishery Leaflet 428; Part 5, "Distribution and Marketing of Fishery Products," Fishery Leaflet 431.

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CONTENTS (CONTINUED)

Page

FOREIGN (Contd.):
- Japan (Contd.):
  - North Pacific Factoryship Salmon Catch for the 1956 Season 94
  - North Pacific Whaling, 1956 95
  - Report on Tuna Fishing Off Tahiti 95
  - Salmon Industry of Hokkaido 95
- Republic of Korea:
  - Market for Marine-Animal Oils 96
- Norway:
  - Canned Brisling Sardine Exports Lower, Jan.-July 1956 97
  - Findings in Study of Arctic-Norwegian Cod 97
  - Foreign Ministry Requests Norway Fishery Pact With Russia 98
  - Pelagic Purse-Seining for Cod Being Tested 98
  - Plan to Advertise Fresh Fish 99
- Pakistan:
  - Frozen Fish Exempted From Export Duty 99
- Portugal:
  - Cod Fishing Fleet Reports Good Catches on Newfoundland and Greenland Banks 99
  - Fisheries Trends, June 1956 100
  - Canned Fish Exports, January-June 1956 100
  - Canned Fish Pack, Jan.-April 1956 100
- South-West Africa:
  - Skipjack Tuna Netted Near Walvis Bay 101
- Spain:
  - Fisheries Trends, August 1956 101
- Sweden:
  - Care of Frozen Foods Stressed by Health Authorities 102
  - Imports From the Dollar Area Liberalized 102
  - Loan Program for Commercial Fishermen 102
  - New Fish Freezing Facilities Proposed for Goteborg 103
  - Workmen's Compensation Act Covers Fisheries . 104
- Turkey:
  - Market for Marine Animal Oils 105

Page

FOREIGN (Contd.):
- Union of South Africa:
  - Central Sales Organization for Canned Fish Set Up . 105
  - Echo-Sounder in Demand by Fishing Fleet 105
  - Pilchard-Maasbanker Catch Through June 1956 Poor 106
  - Fisheries Trends, August 1956 107
- U. S. S. R.:
  - Murmansk--A Major Fishing Port 107
- United Kingdom:
  - Canned Sardine Market 108
  - Fish Meal Production Increase Sought 110
  - Interest Rates on Loans for Vessels and Gear Increased 111

FEDERAL ACTIONS: 112
- Department of the Interior:
  - Fish and Wildlife Service:
    - Fisheries Loan Fund Activities Initiated 112
    - Interior and Small Business Administration Cooperate in Granting Fishery Loans 114
    - Revised Regulations Adopted For New England Haddock Fishery 114
  - Tariff Commission:
    - "Escape Clause" Report on Groundfish Fillets Released 117

FISHERY INDICATORS: 119
- Chart 1 - Fishery Landings for Selected States ... 119
- Chart 2 - Landings for Selected Fisheries 120
- Chart 3 - Cold Storage Holdings and Freezings of Fishery Products 121
- Chart 4 - Receipts and Cold-Storage Holdings of Fishery Products at Principal Distribution Centers 122
- Chart 5 - Fish Meal and Oil Production - U. S. and Alaska 123
- Chart 6 - Canned Packs of Selected Fishery Products 123
- Chart 7 - U.S. Fishery Products Imports 124

RECENT FISHERY PUBLICATIONS: 126
- Fish and Wildlife Service Publications 125
- Miscellaneous Publications 127